

UNITED STATES SIGNAL SERVICE

MONTHLY WEATHER REVIEW.

VOL. XVIII.

WASHINGTON CITY, NOVEMBER, 1890.

No. 11.

INTRODUCTION.

This REVIEW is based on reports for November, 1890, from 2,314 regular and voluntary observers. These reports are classified as follows: 168 reports from Signal Service stations; 118 reports from United States Army post surgeons; 1,462 monthly reports from state weather service and voluntary observers; 31 reports from Canadian stations; 188 reports through the Central Pacific Railway Company; 347 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather

Service;" monthly reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, Tennessee, Texas, and Wisconsin, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR NOVEMBER, 1890.

The month was the driest November on record at stations on the south New England coast, in the middle and south Atlantic and east Gulf states, in the upper Missouri valley, in the middle and northern plateau regions, and along the Pacific coast. At Fort Stanton, N. Mex., and Fort Apache, Ariz., the precipitation was the heaviest ever reported for November. At stations on the middle Pacific coast having long records no precipitation was reported, while the average precipitation for November in that district is 2.83. In the northern plateau region about 2 per cent. of the average precipitation for November was reported. In the middle and south Atlantic and east Gulf states, and in the middle plateau region one-tenth to two-tenths, in New England, the Rio Grande Valley, the extreme northwest, and the north and south Pacific coasts one-fourth to one-half, and in the Ohio Valley and Tennessee, the upper Mississippi valley, the upper lake region, the northeast slope of the Rocky Mountains, and the west Gulf states two-thirds to three-fourths of the usual amount of precipitation for November was reported. At Key West, Fla., and on the southeast slope of the Rocky Mountains the monthly precipitation was about double the average, and in the southern plateau and the Missouri Valley it was about one-tenth greater than the average for November. In the lower lake region the precipitation was about normal. The greatest depth of snowfall reported was 27 inches, at Cumbres, Colo. The monthly snowfall exceeded 15 inches in central Colorado, and was more than 10 inches in extreme north upper Michigan, southwest Nebraska, central New York, and west-central South Dakota. Trace of snow fell north of a line traced from south New Jersey irregularly west-southwest to north-central Tennessee, thence irregularly northward to east Iowa, thence southwestward to southeast Arizona, thence northwestward over east California to north-central California, and thence northeastward to north Idaho.

The month was the warmest November in the history of the Signal Service at stations in the Atlantic coast states from Virginia to north Florida, in the east Gulf states, the Ohio Valley and Tennessee, the upper Mississippi, Missouri, and Red River of the North valleys, and along the middle and

south Pacific coasts. During a warm spell which prevailed in Minnesota, Iowa, Nebraska, and the Dakotas from the 15th to 26th the temperature was 15° to 26° above the normal for the latter half of November, and it was the warmest period on record for the season in that region during the last sixteen years. The highest temperature reported by a regular station of the Signal Service was 96°, at Los Angeles, Cal., and by a voluntary observer, 102°, at Pomona, Cal. The lowest temperature reported by a regular station of the Signal Service was -2°, at Saint Vincent, Minn., and by a voluntary observer, -20°, at Breckenridge, Colo. Killing frost occurred as far south as Mobile, Ala., on the 4th, where it was about two weeks earlier than usual, and at Portland, Oregon, on the 6th, where it was about one week later than usual.

A tornado was reported near Erie, Pa., on the 17th, and a heavy hail storm in the Wyoming Valley, Pa., on the 19th. Heavy wind storms occurred over Lakes Ontario, Huron, and Superior on the 2d; on Lake Michigan on the 3d; on Lakes Huron and Michigan on the 5th; on Lake Michigan on the 6th; at Fort Bowie, Ariz., on the 7th; on Lake Erie and at Healdton, Ind. T., on the 9th; at Fayette, Miss., on the 15th; and in Louisiana on the 16th. A high "norther" prevailed in California on the 11th and 12th, and severe gales occurred over south and east Florida on the 29th. A heavy gale, attended with squalls of almost hurricane force and unusually high seas, caused considerable damage to shipping interests in Newfoundland on the 29th. Floating ice was reported in the Mississippi River at Saint Paul, Minn., on the 9th, and thin ice covered the river at Red Wing, Minn., on the 10th. From the 9th to 14th floating ice was reported in the Missouri River at Fort Buford, N. Dak.; on the 8th anchor ice was observed at Seranton, S. Dak.; on the 10th ice was running in the river at Fort Sully, S. Dak., and on the 11th navigation closed at that point. Ice interrupted navigation on the Erie Canal in east-central New York on the 27th and 28th. Floods and high water in the rivers were reported in west Arizona on the 8th. On the 7th auroras were noted in the Atlantic coast states from New Hampshire to Maryland, and in Wisconsin, Minnesota, Iowa, Nebraska, the Dakotas, and Montana.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for November, 1890, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart II by isobars. The departure of the mean pressure for November, 1890, obtained from observations taken twice daily at the hours named, from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me.....	+ .008	Duluth, Minn.....	+ .004
Boston, Mass.....	+ .012	New Orleans, La.....	+ .004
New York City.....	+ .011	Memphis, Tenn.....	.000
Philadelphia, Pa.....	+ .009	Saint Louis, Mo.....	.000
Washington City.....	+ .010	Santa Fe, N. Mex.....	-.006
Savannah, Ga.....	+ .009	Denver, Colo.....	-.003
Buffalo, N. Y.....	+ .011	Fort Assiniboine, Mont.....	-.009
Detroit, Mich.....	+ .009	Salt Lake City, Utah.....	-.005
Chicago, Ill.....	+ .004	San Francisco, Cal.....	-.016
Cincinnati, Ohio.....	+ .007	San Diego, Cal.....	-.015

The mean pressure was highest from east Washington south-eastward to east Colorado, where it was above 30.25, whence it decreased to less than 30.05 on the south Pacific coast and over the southwest part of the southern plateau, southeastward to less than 30.15 along the immediate Gulf coast, eastward to less than 29.90 in the lower Saint Lawrence valley, and northward to less than 30.00 in the Saskatchewan Valley.

A comparison of the pressure chart for November with that of the preceding month shows an increase in mean pressure over the entire country, the increase being most marked over the Rocky Mountain and northern and middle plateau regions and thence eastward to the Red River of the North and lower Missouri valleys and west Texas, where it exceeded .15. From this region the increase became less marked westward to the immediate middle and south Pacific coasts, where it was less than .10, and eastward to the north part of the upper lake region and the lower Saint Lawrence valley, where it was less than .05. The increase was also less than .05 over south Florida. The area of high pressure which covered Oregon, north Nevada, and northwest Utah in October extended southeastward, with an increase in mean pressure of about .15. Within the area of low pressure which extended over east Nova Scotia and Cape Breton Island in October there was an increase of about .10. In the Saskatchewan Valley the increase ranged from .05 to .10, and on the extreme south Pacific coast and in the lower Colorado valley the mean pressure was .10 to .13 higher than for October.

The mean pressure was above the normal, save from the valley of the Red River of the North southeastward over the Lake region and the middle Atlantic states and eastward over the Saint Lawrence Valley, New England, and the Canadian Maritime Provinces, and along the immediate Pacific coast south of the 40th parallel. The greatest departures above the normal pressure were noted in east Washington, where they exceeded .15, and the most marked departures below the normal pressure occurred in the Saint Lawrence Valley and in Nova Scotia and New Brunswick, where they were more than .05. At Key West, Fla., the mean pressure was normal.

The monthly barometric ranges at regular stations of the Signal Service are shown in the table of Signal Service data on the last two pages of the REVIEW.

AREAS OF HIGH PRESSURE.

Seven areas of high pressure were observed within or near the limits of stations of observation during the month of November. Five of these areas of high pressure apparently formed over the Rocky Mountain regions, and after remaining almost stationary during the time covered by two or more telegraphic reports, they moved first to the southeastward towards the Mississippi Valley, from which region the direction of movement was slightly to the north of east until the area

passed beyond the Atlantic coast line when the southeasterly movement was resumed. Five of the observed areas reached the Atlantic coast and one was first observed on the north Pacific. The region of greatest frequency includes the eastern and middle slopes of the Rocky Mountains, which is about one thousand miles to the southwest of the region of greatest frequency of areas of low pressure.

The following is a general description of the weather conditions attending each area of high pressure as obtained from the regular telegraphic reports.

I.—On the 1st of the month the barometric pressure was abnormally high over the Rocky Mountain regions, the centre of greatest pressure being in northern Washington. The pressure was also above the normal throughout the Southern States, due to the preceding area of high pressure which was attended by frosts on the morning of the 1st as far south as northern Florida. A storm of marked energy prevailed over the Lake region, the centre being near to and north of Lake Superior. This general distribution of pressure continued until the morning of the 2d, when the centre of high pressure had advanced eastward to Montana and the area covered the entire country west of the 100th meridian. The storm in the Lake region had increased in energy, while its easterly movement had been retarded. Strong westerly gales prevailed throughout the Lake region, and high northwesterly winds were reported in the Missouri Valley. After the morning of the 2d the direction of movement of this high area changed to the southward, and it passed rapidly over the eastern slope of the Rocky Mountains to Texas where it was central on the 3d, and it was last traced on the morning of the 4th over the lower Rio Grande valley, the weather being clear and cold throughout the Southern States, and killing frosts were reported as far south as Mobile, Ala.

II.—Was observed in the region north of Montana on the afternoon of the 6th, although the pressure had been above the normal in the region north of Minnesota on the previous day, and the reports indicate that an area of high pressure passed eastward north of the stations of observation during the 5th and 6th. This area passed southeastward to the upper Missouri valley during the night of the 6th, and thence eastward over the upper lake region, the pressure increasing at the centre during the easterly movement. It passed north of the lower lake region during the 8th, crossed the lower Saint Lawrence valley, and reached the New England coast on the 9th. Although the pressure increased with the easterly movement, it became more contracted as it approached the coast, moving with an unusually high velocity, and only its western margin was observed on the afternoon of the 9th, covering eastern Nova Scotia.

III.—Formed over the eastern and central slopes of the Rocky Mountains on the 9th, the barometric pressure being above the normal over the north Pacific coast and the central plateau region. It moved eastward, covering the entire Mississippi Valley on the 10th, and the greater portion of the country east of the Mississippi Valley during the 11th. It was apparently re-enforced from the Hudson Bay region on the afternoon of the 10th, and moved slowly southward during the 11th, reaching the middle Atlantic coast on the morning of the 12th, after which it apparently disappeared by a gradual decrease of pressure.

IV.—Was first observed on the Pacific coast on the morning of the 11th, although the pressure had been above the normal in that region during the 9th and 10th. It increased from 30.44 to 30.60 at Portland, Oregon, during the night of the 10th. It moved to the northeast until after the centre passed the coast line, and thence to the southeast to southern Idaho, where it remained almost stationary for twenty-four hours, but the reports indicate that the weather conditions over the entire region south of the Missouri Valley during the 12th and 13th

resulted from the influence of this area over that section. During the 13th this area passed northwestward over the north Pacific coast, and on the succeeding day it resumed its southeasterly movement, passing from British Columbia to northern Colorado during the 14th. After reaching Colorado it moved directly eastward, passing slowly over the eastern slope of the Rocky Mountains and very rapidly over the Mississippi Valley and Lake region. On the morning of the 16th it covered the districts on the Atlantic coast and the greater portion of the Lake region, the centre being over Lake Ontario. From this region it passed southeastward over the Atlantic, disappearing during the 17th.

V.—Formed over the plateau region during the 16th and moved slowly eastward, reaching the eastern slope of the Rocky Mountains by the morning of the 19th, when it was central in eastern Colorado, and covered the greater portion of the United States, the only section not within its limits being the Saint Lawrence Valley, New England, and the east portion of the Lake region. It moved slowly to the southeastward during the 19th, reaching the lower Mississippi valley on the 20th, where it apparently disappeared by gradual decrease of pressure.

VI.—This area also formed over the plateau region, and was first observed as central over northern Nevada on the afternoon of the 20th. It apparently resulted from the cold air which remained over the Rocky Mountain region after the preceding area of high pressure had moved southeastward to the Mississippi Valley. It moved rapidly northeastward to the upper Missouri valley during the night of the 20th, where it was apparently re-enforced from the north, after which it moved rapidly southward over the eastern slope of the Rocky Mountains, reaching northern Texas on the morning of the 23d. At this point the direction of movement changed to the east, and, as the centre approached the coast, to the northeast. The area was last observed on the morning of the 24th as central in southern Virginia, and including within its limits the Atlantic coast states from New England to Florida; it disappeared during the 24th.

VII.—As in the preceding case, high area VII formed over the plateau region as a secondary, while the principal area of high pressure covered the eastern slope of the Rocky Mountains. It was observed on the 23d over Nevada, and moved northeastward to Montana where it was central on the 25th. From Montana it moved southeastward to Kansas, being well defined and embracing within its limits the greater portion of the United States. During the 26th the centre of greatest pressure moved to the westward, and this area remained in the central Rocky Mountain region from the 27th to the close of the month, moving first slowly to the northwest, reaching southern Idaho on the 28th, and afterwards to the south, reaching northern New Mexico at the last telegraphic report of the month.

AREAS OF LOW PRESSURE.

Twelve areas of low pressure were observed within or near the limits of stations of observation during the month of November, the mean track of these disturbances being farther to the north than usual. The region of greatest storm frequency was to the north of Lake Superior, over which the centres of eight disturbances were traced. Three depressions passed from the Missouri Valley over the lower lake region; two reached the Atlantic on the north New England coast, and only one could be clearly traced from the Pacific coast. By reference to chart I it will be seen that all depressions passed to the north of the Ohio Valley, and that none reached the Atlantic coast south of New England.

The following is a general description of the more important weather conditions observed during the transit of these disturbances over the field of observation:

I, II, and III.—This storm was partially described in the preceding REVIEW. It apparently originated in the region north of Montana, and at the first telegraphic report of the current month it was central north of and near Lake Superior

as a storm of great extent and considerable energy. The barometric gradient was well marked to the south and west, a belt of high pressure extending from the middle and south Atlantic coasts westward to the Rocky Mountains and thence northward to British Columbia. This storm moved southeastward to the upper Saint Lawrence valley, which it reached on the afternoon of the 2d, when its course changed to the northeast, and it moved rapidly down the Saint Lawrence Valley, disappearing east of the Maritime Provinces on the 3d. It increased in energy during its southeasterly movement, and the attending westerly gales in the Lake region, which were accompanied by freezing weather and light snow, were unusually severe. The depression traced as number II on chart I formed as a secondary disturbance in the region north of North Dakota during the 2d, when the principal disturbance covered the Saint Lawrence Valley. It moved eastward north of Lake Superior, attended by general snows and strong westerly winds in the Lake region, but lost energy during its easterly movement, and could not be traced on the telegraphic weather chart farther to the east than the upper Saint Lawrence valley, and its disappearance was doubtless due to the rapid advance of low area III, which was first observed in the region north of North Dakota on the 4th, and which moved southeastward towards Lake Superior, apparently reaching its maximum intensity while passing over Manitoba, where the barometer fell to 29.20 on the afternoon of the 4th. By the morning of the 5th the centre was near to, and directly north of, Lake Superior, and, although strong southwesterly gales occurred on Lakes Michigan and Superior during the night, the pressure was increasing at the centre of disturbance, and by the afternoon of the 5th this low area had disappeared from the field of observation, attended, however, by strong southwesterly gales in the lower Saint Lawrence valley. The three disturbances above referred to were at no time central within the limits of stations of observation, and they passed rapidly eastward to the north of the Lake region, the barometric pressure remaining below the normal over the region covered by the tracks of the low areas, there being no intervening area of high pressure.

IV and V.—Formed on the eastern slope of the Rocky Mountains over Indian Territory on the 6th, and in the eastern extremity there was a barometric trough which extended westward to the Pacific coast. An area of high pressure existed to the north in the Dakotas and the adjoining states, which apparently forced this trough of low pressure to the southward, and during the 6th the flow of cold air from the north over the Rocky Mountain region resulted in the formation of two depressions, one of which has been traced as number IV and the other as number V on chart I. The disturbance which formed to the east of the Rocky Mountains moved rapidly to the northeastward over the Lake region during the 6th and 7th, attended by light rains in the central valleys and Lake region. It increased in intensity until the centre reached the lower Saint Lawrence valley on the 8th, the southerly gales being unusually severe in that section. Reports indicate that the course of this storm changed to the eastward after reaching the Atlantic. The area of low pressure traced as number V was central over southern California on the morning of the 7th, and its movement eastward from that region can be readily traced from the regular telegraphic reports. It crossed the Rocky Mountains during the 8th, attended by general snow from Colorado eastward to the Missouri Valley, and rain from northern Texas eastward over the central valleys. Its movement was unusually rapid during the 8th, and by the morning of the 9th the centre had reached Lake Superior, and the storm conditions covered the Northern States. General rains were reported in the Lake region, northern New York, and northern New England, heavy snows near Lake Superior, and a cold wave of limited area in the Missouri Valley on the morning of the 9th. The northeasterly course of this storm continued until the morning of the 10th, when its centre was located to the northeast of Anticosti Island, Gulf

of Saint Lawrence, and southerly gales were reported from the southern portions of Newfoundland.

VI.—This depression appeared to the north of Montana on the 10th, and although it caused no marked change in the weather conditions within the limits of the United States, its movement eastward can be readily traced from the regular telegraphic weather charts until the morning of the 12th when the centre of disturbance was located far to the north of Lake Superior. As in the case of number II, the disappearance of this area was probably due to the formation of a second disturbance to the westward, which, however, was so far to the north as to render it impossible to definitely locate the centre of disturbance from the regular telegraphic reports.

VII.—The a. m. report of the 14th exhibited a barometric trough covering the eastern slope of the Rocky Mountains, and the direction and force of wind indicated that a disturbance was forming over Kansas and Nebraska. The advance of an area of high pressure from the northwest forced the trough of low pressure to the southeastward, causing general rains throughout the central valleys, the rainfall being unusually heavy from Texas northward over Kansas, where the wind shifted quickly to the north, attending a sharp fall in temperature. This storm apparently formed in the lower Rio Grande valley and moved parallel to the west Gulf coast, reaching the vicinity of Galveston, Tex., on the 16th. The trough of low pressure covered the central valleys, and a secondary disturbance formed over Missouri on the afternoon of that date, the original disturbance disappearing while central over Louisiana. The secondary disturbance moved eastward over the Lake region during the 17th, and reached the New England coast on the 18th, the pressure decreasing at the centre during the easterly movement, the minimum pressure observed being 28.90 at Cape Race, Newfoundland, on the 18th.

VIII.—This storm developed in the region north of Montana when the preceding disturbance covered the Lake region. It moved rapidly eastward, inclining toward the Lake region, during the 17th and 18th, without causing any marked change in the weather conditions. It crossed the lower Saint Lawrence valley on the 19th and developed great energy after reaching the coast of Nova Scotia. It apparently changed direction to the northeast during the 20th, and was last ob-

served as central near Sydney, C. B. I., on the afternoon of that date, when the barometer indicated a pressure of 29.18.

IX.—Developed in the region north of Montana on the 19th and moved eastward north of the stations of observation during the two succeeding days, following the same general course as that given for the preceding area of low pressure until the centre reached the Saint Lawrence Valley. This disturbance increased in energy during its easterly movement, and, as in the preceding case, caused no marked changes in the general fair weather conditions which prevailed over the United States.

X.—This depression also developed in the region north of Montana, it being first observed in that region on the morning of the 21st. It moved eastward, inclining toward the Lake region during the 23d and 24th, apparently reaching its maximum energy while passing north of Lake Superior. Strong westerly winds were reported from the Lake region on the 24th, but, as in the preceding cases, the weather remained generally fair over the greater portion of the United States. After reaching the Saint Lawrence Valley on the 25th light snows occurred in northern New England and northern New York, but the weather remained generally fair over the remaining portions of the country. This storm disappeared to the northeast of the Maritime Provinces on the 26th, and was followed by a second disturbance during the 27th and 28th, the track of which is not given on chart I, as the centre of disturbance was so far to the north that its movements could not be definitely determined.

XI.—Apparently developed to the west of Hudson Bay during the 29th and passed southeastward to the Saint Lawrence Valley, where it changed direction to the north of east, it being located as central near Anticosti Island, Gulf of Saint Lawrence, at the close of the month.

XII.—Apparently developed north of western Montana on the 29th. It moved southeastward, following the general course of the Missouri Valley, and reached northern Iowa at the close of the month, attended by a trough of low pressure which extended from the upper lake region to the Rocky Mountains, the weather remaining clear to the south and west of the disturbance, while general snows were reported from the upper lake region.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.											
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.		
High areas.		°	°	°	°	Days.	Miles.		Inch.			°							
I.	1	47	117	27	100	3-0	30	Grand Haven, Mich.	.38	2	Keokuk, Iowa.	.18	2	Huron, S. Dak.	n.	30	2		
II.	6	53	113	46	65	2-5	45	Quebec, Quebec	.62	8	Northfield, Vt.	.26	8	Fort Buford, N. Dak.	nw.	26	7		
III.	9	39	102	42	75	3-0	26	Rockliffe, Ont.	.62	10	Chicago, Ill.	.26	9	Cheyenne, Wyo.	n.	32	9		
IV.	11	44	128	34	70	6-0	30	Omaha, Nebr.	.36	15	Fort Custer, Mont.	.17	11	Helena, Mont.	sw.	34	14		
V.	16	39	115	35	86	4-5	19	do	.24	19	Indianapolis, Ind.	.20	17	Pensacola, Fla.	ne.	26	20		
VI.	20	42	116	38	78	3-5	45	Fort Buford, N. Dak.	.58	21	Saint Louis, Mo.	.17	22	Dodge City, Kans.	n.	32	21		
VII.	23	41	114	37	106	7-5	16	Port Arthur, Ont.	.56	25	Omaha, Nebr.	.23	25	Fort McKinney, Wyo.	n.	26	25		
Mean.						4-3	30		.48			.21					29		
Low areas.									Fall.			Rise.							
I.	1	49	87	49	65	2-0	20	Cleveland, Ohio	.42	1	Nashville, Tenn.	.15	1	Chicago, Ill.	sw.	44	1		
II.	2	55	105	50	77	1-5	39	Moorhead, Minn.	.56	3	Dodge City, Kans.	.26	3	Grand Haven, Mich.	n.	44	4		
III.	4	54	103	50	87	1-0	35	do	.58	4	Huron, S. Dak.	.28	4	Chicago, Ill.	sw.	46	5		
IV.	6	36	99	50	67	2-0	42	Father Point, Quebec	.56	7	Father Point, Quebec	.20	7	Sydney, C. B. I.	w.	40	8		
V.	7	34	115	50	59	3-0	48	Alpena, Mich.	.66	9	Oklahoma City, Okla. T.	.25	8	Chicago, Ill.	se.	44	8		
VI.	10	54	111	52	87	2-0	23	White River, Ont.	.24	11	Saint Vincent, Minn.	.16	11	Fort Assiniboine, Mont.	w.	30	11		
VII.	14	26	100	31	93	2-0	14	Corpus Christi, Tex.	.22	14	Louisville, Ky.	.17	14	Galveston, Tex.	nw.	36	16		
VIII.	16	37	94	47	57	2-0	49	Albany, N. Y.	.54	17	Cincinnati, Ohio	.22	17	Boston, Mass.	w.	42	18		
IX.	17	53	104	47	58	3-5	31	Sydney, C. B. I.	.36	20	Huron, S. Dak.	.16	17	New York City	w.	38	20		
X.	19	55	113	50	62	4-5	30	Kingston, Ont.	.36	21	Cleveland, Ohio	.19	21	do	nw.	42	22		
XI.	23	56	107	52	60	3-0	30	Rockliffe, Ont.	.48	24	Eastport, Me.	.21	25	Buffalo, N. Y.	sw.	40	25		
XII.	29	52	92	49	63	1-5	41	Green Bay, Wis.	.32	29	Des Moines, Iowa	.13	29	Grand Haven, Mich.	n.	36	30		
	29	51	115	42	94	1-0	50	Bismarck, N. Dak.	.46	30	Omaha, Nebr.	.20	30	Fort Assiniboine, Mont.	sw.	38	30		
Mean.						2-2	36		.45			.20					40		

NORTH ATLANTIC STORMS FOR NOVEMBER, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the storms that appeared over the north Atlantic Ocean during November, 1890, are shown on chart I. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Twelve storms have been traced for November, 1890, the average number for the corresponding month of the last 8 years being 10.4. Of the storms traced for the current month 8 were continuations of areas of low pressure which moved eastward from the American continent; one appeared over the ocean in high latitudes; one was central southeast of Nova Scotia on the 1st; one first appeared in the vicinity of Bermuda; and one advanced northeastward from southern Florida. Exceptionally severe weather prevailed along the trans-Atlantic routes during a greater part of the month.

During the last 17 years but 3 storms of pronounced strength advanced northward from the West Indies in November. In 1879 a West India cyclone, first located over the southeastern Bahamas, moved rapidly northward and northeastward, passing Cape Hatteras the night of the 19th, and Halifax, N. S., the afternoon of the 20th, and thence moved northeastward over the Gulf of Saint Lawrence or Newfoundland. Furious gales, attaining hurricane force at sea, attended the passage of this storm. On the 29th and 30th, 1887, the path of a storm was approximately located north of the West Indies, and from the 28th to 30th heavy gales, attaining hurricane force, were encountered in that region. In 1888 a storm was first located northeast of the Windward Islands under date of the 17th, whence it moved westward to the Bahamas by the 22d, where it recurved to the northward, and moved north-northeast to eastern New England by the 28th. This storm was attended by very destructive gales off the coast of the United States from the 21st to 27th. Among the more notable storms whose influence has been severely felt off the American coast are: a storm in 1873, which developed over north Georgia on the 16th, passed off the North Carolina coast on the 17th, and over the Bay of Fundy into the Gulf of Saint Lawrence during the 18th, attended by fierce gales and fearful seas. At Norfolk, Va., the barometer fell to 28.86 (733) on the 17th. In Chesapeake Bay the storm was extremely severe. At Cape May, N. J., the barometer fell to 28.76 (730), and the gales off the coast were reported the severest in years. On the 18th the barometer fell to 28.72 (729) at New Haven, Conn.; at Wood's Holl, Mass., to 28.60 (726); at Boston, Mass., to 28.61 (727); and at Portland, Me., to 28.49 (724). The storm was also very severe over the Canadian Maritime Provinces, and was attended throughout by heavy rain or snow. In 1877, during the night of the 23d-24th, when a storm which had advanced from the north Pacific coast was central in West Virginia, the U. S. S. "Huron" was wrecked on the North Carolina coast 50 miles north of Cape Hatteras. A southeasterly wind was blowing, with a heavy southeast swell, at the scene of the disaster.

In November, 1890, a storm was central southeast of Nova Scotia on the 1st, with pressure about 29.40 (747) and fresh to strong gales. A storm was also central on this date over mid-ocean in high latitudes, with pressure falling to about 29.40 (747). By the 2d the storm first referred to had moved northeast of the Grand Banks attended by strong gales, and the storm over mid-ocean on the 1st had moved to the north of Scotland, and pressure falling to 28.82 (732) was reported at Leith. On the 3d the storm over the ocean had advanced to high latitudes and stormy weather prevailed over the west parts of the British Isles. A storm, central over the Gulf of Saint Lawrence on this date, moved east-northeast over north Newfoundland by the 4th, to about the 30th meridian by the 5th, to west of the British Isles by the 6th, and thence over north Scotland by the 7th, with pressure falling to 28.67 (728) at Leith on the last named date. On the 7th heavy storms

prevailed throughout Great Britain and Ireland, causing the loss of a number of coasting vessels. During the 8th and 9th a storm was central north of Ireland, with pressure about 29.20 (742). On the 9th a storm which had advanced from the Gulf of Saint Lawrence was central northeast of the Grand Banks, with pressure about 29.30 (744), whence it passed rapidly eastward to about the 17th meridian by the 10th, with pressure about 29.00 (737) and heavy gales, after which it recurved to the northward with a slight increase in central pressure, and after the 11th apparently united with a storm which had advanced from the Gulf of Saint Lawrence to about the 22d meridian during the 10th, 11th, and 12th, attended by violent gales and pressure falling below 29.00 (737) on the 11th and 12th, after which it disappeared north of the region of observation. During the 13th, 14th, and 15th low pressure and gales continued over mid-ocean. On the 15th a storm was central northeast of the Grand Banks, to which position it had advanced from the Gulf of Saint Lawrence. By the 17th this storm had moved slowly south of east to the 34th meridian, with pressure about 29.30 (744) and fresh to strong gales, after which it recurved north and west and apparently united with a storm which advanced from the southwest. On the 18th a storm was central south of Nova Scotia, with pressure about 29.20 (742), whence it moved rapidly to northeast of the Grand Banks by the 19th, where the pressure fell to about 28.70 (729) and heavy storms prevailed, after which it disappeared north of the region of observation. On the 20th a storm was central south of Nova Scotia, with pressure about 29.40 (747), whence it passed to northeast of Newfoundland by the 21st, after which it disappeared north of the region of observation. On the 23d a storm was central north of the Gulf of Saint Lawrence, whence it moved to north of Newfoundland by the 24th, after which it disappeared north of the region of observation. On the 23d and 24th a violent gale prevailed over Great Britain, and a number of wrecks and collisions was reported. During the 26th and 27th a storm passed north of east north of the Gulf of Saint Lawrence and Newfoundland. On the 28th a storm of considerable strength appeared north of Bermuda, whence it moved northeastward to south of Newfoundland by the 29th. On this date a heavy northeast gale and high tides prevailed along the east coast of Newfoundland, and the pressure fell to 28.45 (723) at Saint John's at 5 p. m. Reports from other points in Newfoundland show great damage to shipping interests. By the 30th this storm had advanced northeastward to about the 40th meridian without an appreciable loss of energy. On the morning of the 29th a storm appeared over the southern extremity of Florida, whence it moved northeastward and on the morning of the 30th was central about midway between Bermuda and the south Atlantic coast. On the night of the 30th a heavy southeast gale prevailed over Bermuda. Houses were unroofed and a great amount of damage caused to other property and crops. The storm was also very severe over the ocean between Bermuda and the south Atlantic coast.

OCEAN ICE IN NOVEMBER.

The only Arctic ice reported for November, 1890, was a small piece of ice in N. 46° 35', W. 47° 51' on the 16th.

In November, 1882, 1883, 1887, and 1888, no Arctic ice was reported near Newfoundland or the Grand Banks. In 1884 several icebergs were seen in N. 45° 56', W. 52° 38'. In 1885 the only iceberg reported was observed in N. 48° 00', W. 51° 10'. In 1886 one iceberg was reported in N. 45° 20', W. 45° 26'.

FOG IN NOVEMBER.

The limits of fog-belts west of the 40th meridian, as determined from reports of shipmasters, are shown on chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 10 dates; between the 55th and 65th meridians on 1 date; and west of the 65th meridian on 2 dates. Compared with the corresponding month of the last 3 years the

dates of occurrence of fog near the Grand Banks numbered 2 less than the average; between the 55th and 65th meridians 3 less than the average; and west of the 65th meridian 6 less than the average. On the dates fog was reported east of the 65th meridian it occurred with the approach or passage to the northward of general storms. On the dates fog was reported

west of the 65th meridian, the 15th and 16th, it was encountered off the New Jersey coast with rain and unsettled weather. On the 7th, 9th, 14th, 17th, and 30th, dense fog occurred at Signal Service stations on the New York and New England coasts with the advance over the Lake region or the Saint Lawrence Valley of storms whose influence extended off the coast.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for November, 1890, is exhibited on chart II by dotted isotherms. In the table of Signal Service data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature was highest over south Florida, where it was above 70, and the mean values were above 60 on the South Carolina and Georgia coasts, along the Gulf coast, in the lower Gila valley, in the Colorado Valley from extreme south Nevada southward, and generally in California south of the 34th parallel. The mean temperature was lowest in extreme north Ontario, and at elevated stations in west-central Colorado, where it was below 25, and the mean readings were below 30 in the lower Saint Lawrence valley, north Maine, north Ontario, at extreme northern upper lake stations, in north Minnesota and northeast North Dakota, in the British Possessions north of North Dakota, and from central Wyoming southward over west-central Colorado. The mean temperature was below 40 north of a line traced from south New England westward to central Colorado, thence southward to central New Mexico, thence irregularly northward to west-central Nevada, and east of this line continued northward over Oregon and Washington.

The mean temperature was above the normal except from Lakes Ontario and Huron eastward over New England and the Saint Lawrence Valley, in extreme south Florida, and in extreme southeast Arizona. The greatest departure above the normal temperature was noted in north North Dakota and Montana and the British Possessions to the northward, where it exceeded 10, and the departure above the normal exceeded 6 in the upper Missouri and Red River of the North valleys, at stations in Tennessee and the east Gulf states, in the Sacramento Valley, and on the south Pacific coast. In districts where the mean temperature was below the normal the departure was less than 2.0, save at Albany, N. Y., and Portland, Me., where it was 2.6 and 2.1, respectively.

At stations in the Atlantic coast states between the 30th and 40th parallels, in the east Gulf states, the lower and middle Mississippi and Ohio valleys, on Lake Erie, in the middle and upper Missouri and Red River of the North valleys, and on the middle and south Pacific coasts the current month was the warmest November in the history of the Signal Service. In the middle and south Atlantic and east Gulf states the mean temperature was 0.5 to 4.0 higher than previously reported for November; in the lower Mississippi valley 0.2 to 2.6 higher; in the Ohio Valley 0.5 to 1.6 higher; in the middle Mississippi valley 0.1 to 0.2 higher; in the Missouri Valley 0.4 to 1.8 higher; and on the middle and south Pacific coasts 0.4 to 4.1 higher. In November of preceding years the highest mean temperature occurred over the middle and northern plateau regions and on the northeast slope of the Rocky Mountains in

1885; in the interior of the south Atlantic states in 1883; along the middle and south Atlantic coasts in 1881; from Texas northeastward to the middle Ohio valley in 1879; from the northeast and middle-eastern slopes of the Rocky Mountains eastward over the upper lakes, and over north California in 1878; in Oregon in 1877; and in the east Gulf states in 1875.

The coolest November in the history of the Signal Service occurred in North and South Carolina and over the entire country west of the Rocky Mountains, save in Arizona and California south of the 40th parallel, in 1880, when the departures above the normal varied from 2 to 10 in the lower Mississippi valley and in the Gulf states; from 5 to 11 in the middle and upper Mississippi and Ohio valleys and the Lake region; 5 to 10 in the Missouri Valley; from 6 to 15 in the middle plateau region and on the middle-eastern slope of the Rocky Mountains, and from 3 to 6 on the middle and north Pacific coasts. The coldest November noted in New England, New York, and Pennsylvania occurred in 1873, when the mean was 5 to 9 below the normal; and from north Florida and east Georgia northward over east Tennessee, and thence eastward over south Virginia in 1872, when the mean was 4 to 6 below the normal.

DEVIATIONS FROM NORMAL TEMPERATURE.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for November for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for November, 1890; (4) the departure of the current month from the normal; (5) the extreme monthly mean for November, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of Nov.	(2) Length of record.	(3) Mean for Nov., 1890.	(4) Departure from normal.	(5) Extreme monthly mean for Nov.			
						Highest.	Year.	Lowest.	Year.
<i>Arkansas.</i>									
Lead Hill	Boone	46.9	9	51.2	+ 4.3	51.2	1890	44.1	1889
<i>California.</i>									
Sacramento	Sacramento	52.6	37	44.9	- 7.7	57.5	1873	44.9	1890
<i>Connecticut.</i>									
Middletown	Middlesex	39.4	24	39.5	+ 0.1	45.1	1859	31.6	1873
<i>Florida.</i>									
Merritt's Island	Brevard	67.6	8	71.3	+ 3.7	73.3	1883	60.0	1885
<i>Georgia.</i>									
Forsyth	Monroe	56.1	15	61.7	+ 5.6	61.7	1890, '74	51.0	1880
<i>Illinois.</i>									
Peoria	Peoria	39.6	34	44.2	+ 4.6	44.6	1867	30.2	1880
Riley	McHenry	33.6	34	38.4	+ 4.8	40.3	1865	24.1	1880
<i>Indiana.</i>									
Vevay	Switzerland	43.5	25	48.0	+ 4.5	48.7	1879	33.0	1869
<i>Iowa.</i>									
Cresco	Howard	28.5	18	33.6	+ 5.1	34.7	1878	19.2	1880
Monticello	Jones	33.5	35	37.5	+ 4.0	41.5	1859	24.4	1863
Logan	Harrison	35.8	16	41.9	+ 6.1	41.9	1890	27.5	1880
<i>Kansas.</i>									
Lawrence	Douglas	39.9	22	44.1	+ 4.2	45.8	1878	31.6	1880
Wellington	Sumner	41.0	11	45.2	+ 4.2	45.5	1879	29.0	1880
<i>Louisiana.</i>									
Grand Coteau	Saint Landry	59.4	8	60.8	+ 1.4	64.0	1883	56.2	1889
<i>Maine.</i>									
Orono	Penobscot	33.8	20	34.7	+ 0.9	38.6	1889	27.1	1875
<i>Maryland.</i>									
Cumberland	Allegany	39.9	31	44.3	+ 4.4	44.7	1883	32.7	1869
<i>Massachusetts.</i>									
Amherst	Hampshire	38.3	54	37.6	- 0.7	44.1	1849	29.7	1873
Newburyport	Essex	39.8	12	39.0	- 0.8	42.1	1889	30.5	1880
Somerset	Bristol	40.6	18	42.5	+ 1.9	45.2	1889	33.0	1873

Deviations from normal temperature—Continued.

State and station.	County.	(1) Normal for the month of Nov.	(2) Length of record.	(3) Mean for Nov., 1890.	(4) Departure from normal.	(5) Extreme monthly mean for Nov.			
						Highest.	Year.	Lowest.	Year.
<i>Michigan.</i>									
Kalamazoo	Kalamazoo ..	36.9	14	43.4	+ 6.5	43.4	1890	27.0	1880
Thornville	Lapeer	37.9	13	39.5	+ 1.6	45.4	1877	28.4	1880
<i>Minnesota.</i>									
Minneapolis	Hennepin ...	29.0	25	34.0	+ 5.0	36.3	1870	17.4	1880
<i>Montana.</i>									
Fort Shaw	Lewis & Clarke	33.4	22	41.7	+ 8.3	43.3	1867	19.9	1871
<i>New Hampshire.</i>									
Hanover	Grafton	34.1	53	32.6	- 1.5	41.6	1849	24.8	1873
<i>New Jersey.</i>									
Moorestown	Burlington ..	41.9	27	43.6	+ 1.7	45.3	1888	36.2	1873
South Orange	Essex	41.2	20	41.3	+ 0.1	44.5	1885	32.6	1871
<i>New York.</i>									
Cooperstown	Otsego	34.9	36	34.7	- 0.2	38.5	1876, '77	26.8	1873
Palermo	Oswego	35.3	36	36.9	+ 1.6	41.9	1859	26.8	1873
<i>North Carolina.</i>									
Lenoir	Caldwell	45.0	18	49.8	+ 4.8	49.8	1890	39.9	1872
<i>Ohio.</i>									
N'th Lewisburgh ..	Champaign ..	39.3	58	43.7	+ 4.4	49.0	1849	29.0	1874, '80
Wauseon	Fulton	35.9	20	40.8	+ 4.9	40.8	1890	27.9	1880
<i>Oregon.</i>									
Albany	Linn	43.9	11	44.3	+ 0.4	47.4	1884	40.7	1880
Eola	Polk	43.0	20	45.2	+ 2.2	49.6	1889	37.6	1872
<i>Pennsylvania.</i>									
Dyberry	Wayne	34.7	22	35.6	+ 0.9	38.3	1883	25.7	1873
Grampian Hills ..	Clearfield ..	35.1	26	39.2	+ 4.1	39.2	1899	28.3	1869
Wellsborough	Tioga	36.8	11	36.2	- 0.6	41.4	1885	36.2	1890
<i>South Carolina.</i>									
Statesburgh	Sumter	53.7	9	58.2	+ 4.5	58.2	1890	51.2	1882
<i>Tennessee.</i>									
Austin	Wilson	47.7	20	52.9	+ 5.2	54.5	1879	40.2	1872
<i>Texas.</i>									
New Ulm	Austin	58.9	18	61.0	+ 2.1	65.6	1879	49.6	1880
<i>Vermont.</i>									
Stratford	Orange	33.3	17	34.6	+ 1.3	37.9	1886	23.4	1873
<i>Virginia.</i>									
Birdnest	Northampton	49.7	22	51.7	+ 2.0	55.6	1881	43.0	1869
<i>Washington.</i>									
Fort Townsend ..	Jefferson	42.8	15	46.1	+ 3.3	47.3	1884	39.2	1880
<i>Wisconsin.</i>									
Madison	Dane	33.1	21	38.4	+ 5.3	45.0	1864	23.4	1861

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 96, at Los Angeles, Cal., on the 3d. The maximum temperature was above 90 at Rio Grande City, Tex., Yuma, Ariz., and San Diego, Cal., and rose above 80 north of a line traced from the North Carolina coast irregularly westward to extreme west Texas, in the lower Gila and lower Colorado valleys, in California south of the 36th parallel, and in the San Joaquin and Sacramento valleys. The maximum temperature was lowest in extreme north upper Michigan, where it was below 50, and it was 60 or below on the southeast New England coast, and north of a line traced from the west Maine coast irregularly westward to northeast Iowa, and thence northwestward over northeast North Dakota. The maximum temperature was also below 60 in extreme northwest Washington. The reports of United States Army post surgeons and voluntary observers show the following maximum temperatures in states or territories where temperature rising to or above 90 was reported: Pomona, Cal., 102; Casa Grande and Fort Lowell, Ariz., 98; Fort Ringgold, Tex., 93. At stations in Va., Ga., Tenn., Tex., S. Dak., Mont., Wash., Oregon, Cal., and Ariz., the maximum temperature was as high or higher than previously reported for November.

The lowest temperature reported by a regular station of the Signal Service was -2, at Saint Vincent, Minn., on the 8th. The minimum temperature was below 10 in north New England, and north of a line traced from west-central Wisconsin irregularly southwestward to north-central New Mexico, thence west of north to southwest Wyoming, thence southward over southwest Utah and east Nevada, and east of this line continued northward over Idaho and west Montana. The minimum temperature was below 40, except in Florida south of the 30th parallel, along the west Gulf coast, in the lower Colorado valley, in south California, and along the Pacific coast south of the 38th parallel. The highest minimum temperature was 65, at Key West, Fla., and the minimum values

were above 50 over Florida south of the 27th parallel. The reports of United States Army post surgeons and voluntary observers show the following minimum temperatures in states and territories where temperature falling to or below zero was reported: Breckenridge, Colo., -20; Camp Pilot Butte, Wyo., -11; Fort Niobrara, Nebr., -8; Pine River and Pokegama Falls, Minn., -7; Woonsocket, S. Dak., -6; Fort Pembina and Steele, N. Dak., -2.

LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather is shown on chart IV by a line traced from the North Carolina coast near Kitty Hawk west-southwest to southeast Mississippi, thence northward to east-central Missouri, and thence southwestward to the middle Rio Grande valley. The western limit is shown on this chart by a line traced from south-central Arizona northwestward to extreme northwest California, and by a second line traced along the immediate coast of southwest Washington.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature are given in the table of Signal Service data. The greatest monthly ranges of temperature occurred in the middle Missouri valley, where they exceeded 70, whence they decreased eastward to less than 40 on the New England coast, southeastward to less than 20 over extreme south Florida, southward to 30 on the west Gulf coast, southwestward to less than 50 on the extreme south Pacific coast, and westward to less than 40 on the middle Pacific coast, and to less than 30 on the north Pacific coast.

FROST.

The first killing frost of the season was reported as follows: 1st, Auburn and Bermuda, Ala.; Augusta and Forsyth, Ga.; Jeffersonville, Ind.; Atlantic City, N. J.; New Berne, Weldon, Southport, and Wilmington, N. C.; Kingston, Tenn.; Lynchburgh, Norfolk, and Stanardsville, Va.; Parkersburgh, W. Va. 3d, Sedan, Kans. 4th, Mobile, Ala.; Shreveport, La.; Washington, Miss.; Corsicana, Tex.; Birdsneat and Lexington, Va. 5th, New London, Conn.; Block Island, R. I. 6th, Astoria and Portland, Oregon; Lapush and Walla Walla, Wash. 7th, Eureka, Georgetown, and Grass Valley, Cal. 8th, Tucson, Ariz.; Eagle Grove, Iowa. 9th, Fort Grant and Grand Central Mill, Ariz. 13th, Bisbee, Ariz. 15th, Natural Bridge, Ariz. 16th, Fort Bowie, Ariz.; El Paso, Tex. 17th, Fort Thomas, Ariz. 21st, Fort Schuyler, N. Y. 23d, Lonoke, Ark. 27th, Abilene, Gallinas, Grapevine, Panter, and Venus, Tex. 28th, New Braunfels, Tex. 29th, Cape Henry, Va.

Compared with the average date of first killing frost in the respective localities the killing frost of the 4th at Shreveport, La., was about seasonable; that of the 1st at Auburn, Ala., and of the 4th at Washington, Miss., was about one week early; that of the 4th at Mobile, Ala., was about 2 weeks early; that of the 1st at Augusta, Ga., and Wilmington, N. C., and of the 6th at Portland, Oregon, was about one week late; that of the 1st at Norfolk and Lynchburgh, Va., was about 2 weeks late; that of the 6th at Walla Walla, Wash., was about 3 weeks late; and that of the 27th at Abilene, Tex., was about one month late.

The first black frost of the season was reported at Raleigh, N. C., on the 1st; at Vicksburg, Miss., and Oswego, N. Y., on the 4th; at New York City and Cleveland, Ohio, on the 5th; at Holbrook, Ariz., on the 10th; at El Paso, Tex., on the 17th.

Light frost occurred as far south as north Florida on the 1st, 4th, and 5th; along the immediate east Gulf coast on the 1st, 2d, 4th, 5th, and 29th; in east Texas to the 29th parallel on the 4th, 26th, and 28th to 30th; to extreme south New Mexico and southeast Arizona on a number of dates; and in extreme southwest California from the 7th to 10th.

The first light frost of the season was reported at regular stations of the Signal Service, as follows: 1st, Kitty Hawk, N. C.; Charleston, S. C.; Savannah, Ga.; Jacksonville and Pensacola, Fla.; Mobile, Ala. 3d, Abilene, Tex. 4th, New Orleans, La.; Palestine, Tex. 6th, Fort Canby, Wash. 8th, Fort Bowie, Ariz. 10th, Fresno, Cal. 12th, El Paso, Tex.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for November, 1890, as determined from the reports of nearly 2,000 stations, is exhibited on chart III. In the table of Signal Service data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The heaviest precipitation for November, 1890, was reported in south-central Louisiana, northeast Arkansas, extreme southwest Tennessee, west-central and northwest Kentucky, along the east coast of south Florida, and in extreme northwest Washington, where it exceeded 6.00. Over a greater part of north California, east Oregon, south Idaho, north Nevada, and northwest Utah, and at stations in southeast California, north-central North Dakota, southwest Nebraska, west-central New Mexico, east-central Texas, east and southeast Mississippi, southeast Tennessee, central Alabama, central Georgia, west South Carolina, west North Carolina, and southeast Virginia no precipitation was reported.

The precipitation was in excess of the November average in an area extending over a part of the middle-eastern and southeast slopes of the Rocky Mountains and the middle Missouri valley and from Arizona to the lower Ohio valley, and at stations in the lower lake region, the middle Saint Lawrence valley, west Nova Scotia, and south Florida; elsewhere it was deficient. The greatest excess in monthly precipitation occurred at Cairo, Ill., Fort Smith, Ark., and Key West, Fla., where it exceeded 2.00. The most marked deficiency was noted on the north Pacific coast and at Hatteras, N. C., where it was more than 5.00, and the precipitation was more than 4.00 below the average in east Tennessee, north Georgia, and at New Orleans, La.

Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: Key West, Fla., 200 per cent.; southeast slope of the Rocky Mountains, 181 per cent.; southern plateau, 112 per cent.; Missouri Valley, 110 per cent.; and lower lake region, 102 per cent. In districts where the precipitation was deficient the percentage of the normal was about as follows: northern plateau, 2 per cent.; east Gulf states, 13 per cent.; south Atlantic states, 14 per cent.; middle Atlantic states, 17 per cent.; middle plateau, 18 per cent.; north Pacific coast, 27 per cent.; New England, 31 per cent.; extreme northwest, 32 per cent.; south Pacific coast, 33 per cent.; Rio Grande Valley, 55 per cent.; Ohio Valley and Tennessee, 61 per cent.; upper lake region, 70 per cent.; northeast slope of the Rocky Mountains, 71 per cent.; upper Mississippi valley, 78 per cent.; west Gulf states, 79 per cent.; and middle-eastern slope of the Rocky Mountains, 85 per cent. At stations on the middle Pacific coast having long records no precipitation was noted, while the average precipitation for November in that district is 2.83.

For the period January to November, 1890, inclusive, the precipitation in the west Gulf states, the Ohio Valley and Tennessee, and the lower lake region was one-tenth to two-tenths greater than the average, while in the south Atlantic and east Gulf states, the Rio Grande and Missouri valleys, the northeast and middle-eastern slopes of the Rocky Mountains, the middle and northern plateau, and the north and south Pacific coasts it ranged from two-thirds to three-fourths of the average. In the middle Atlantic states, at Key West, Fla., in the extreme northwest, on the southeast slope of the Rocky Mountains, over the southern plateau region, and on the middle Pacific coast the precipitation about equalled the average for the period named.

The heaviest precipitation ever reported for November was

noted at Fort Stanton, N. Mex., and Fort Apache, Ariz., in 1890, when the excess above the normal was about 1.50; in Arkansas and north Louisiana in 1889, when the excess varied from 2.00 to 5.00; along the north Pacific coast, in California, and west Nevada in 1885, when the excess was 5.00 to 6.00 on the Washington coast, and varied from 3.00 at Winnemucca, Nev., and 4.00 at Los Angeles, Cal., to about 13.00 at Red Bluff, Cal.; from the lower Missouri valley northeastward over the upper lakes and Lake Erie in 1879, when the excess varied from 2.00 to 5.00; and in Maryland, the District of Columbia, and central and northern Virginia in 1877, when the excess varied from 3.00 to 6.00.

The least precipitation ever reported for November was noted at stations in the Atlantic coast states from south New England to Georgia, in the east Gulf states, the upper Missouri valley, the middle and northern plateau regions, and along the Pacific coast in 1890, when the deficiency below the normal was 3.00 to 4.00 in south New England, 2.00 to 5.00 in the middle and south Atlantic and east Gulf states, 0.30 to 0.40 in the upper Missouri valley, 0.80 to 1.75 in the middle and northern plateau regions, about 6.00 on the north Pacific coast, 2.00 to 3.50 on the middle Pacific coast, and 0.87 to 1.61 on the south Pacific coast. The current month was the first November in the history of the Signal Service during which no rainfall occurred at Red Bluff and San Francisco, Cal. At Sacramento, Cal., no rain fell in November, 1884, at Los Angeles, Cal., in November, 1878 and 1883, and at San Diego, Cal., in November, 1872 and 1878. The least precipitation for November was noted at stations in the Rio Grande Valley in 1879, when the deficiency varied from 0.55 to 2.25; in northern and eastern New England in 1882, when the deficiency was 2.00 to 3.00; along the Mississippi River from Saint Louis, Mo., to La Crosse, Wis., in 1875, when the deficiency was 1.00 to 2.00; and in the Ohio Valley and at Lake Erie stations in 1872, when the deficiency was 2.00 to 3.50.

In 1879, when the precipitation was the heaviest ever reported for November from the lower Missouri valley over the upper lake region, it was the least noted for that month in the lower Rio Grande valley.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for November for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for November, 1890; (4) the departure of the current month from the average; (5) the extremes for November during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of Nov.	(2) Length of record.	(3) Total for Nov., 1890.	(4) Departure from average.	(5) Extremes for Nov.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		Inches	Years	Inches	Inches	Inches		Inches	
Lead Hill.....	Boone.....	4.19	9	3.35	-0.81	5.77	1883	2.50	1885
California.									
Sacramento.....	Sacramento..	2.06	40	T.	-2.06	9.65	1885	0.00	'50, '63
Connecticut.									
Middletown.....	Middlesex....	4.01	30	0.75	-3.26	7.39	1877	0.75	1890
Florida.									
Morriss' Island..	Brevard.....	2.32	12	4.00	+1.68	5.67	1884	0.17	1886
Georgia.									
Forsyth.....	Monroe.....	3.60	16	0.50	-3.12	5.41	1888	0.50	1890
Illinois.									
Peoria.....	Peoria.....	2.34	34	1.79	-0.55	4.93	1879	0.31	1865
Riley.....	McHenry....	2.31	39	1.74	-0.57	8.36	1876	0.06	1862
Indiana.									
Logansport.....	Cass.....	3.70	14	2.05	-1.65	5.76	1881	1.43	1880
Iowa.									
Vevay.....	Switzerland..	3.30	25	2.92	-0.38	6.34	1888	0.73	1872
Wisconsin.									
Cresco.....	Howard.....	1.52	19	1.59	+0.07	5.20	1879	0.18	1875
Monticello.....	Jones.....	2.39	35	2.21	-0.18	5.72	1862	0.12	1865
Logan.....	Harrison....	1.37	20	1.32	-0.05	3.85	1871	0.00	1873

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Nov.	(2) Length of record.	(3) Total for Nov., 1890.	(4) Departure from average.	(5) Extremes for Nov.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
<i>Kansas.</i>		<i>Inches</i>	<i>Years</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>		<i>Inches</i>	
Lawrence	Douglas	1.90	24	2.56	+0.66	5.15	1879	0.01	1872
Wellington	Sumner	1.06	11	3.14	+2.08	3.14	1890	0.18	1886
<i>Louisiana.</i>									
Grand Coteau	St. Landry ..	3.33	7	1.51	-1.82	5.72	1883	1.51	1890
<i>Maine.</i>									
Orono	Penobscot	4.69	20	2.67	-2.02	8.76	1886	1.78	1882
<i>Maryland.</i>									
Cumberland	Allegany	2.29	19	1.83	-0.46	5.34	1889	0.82	1887
<i>Massachusetts.</i>									
Amherst	Hampshire	4.72	45	1.34	-3.38	7.48	1854	1.33	1882
Newburyport	Essex	4.51	13	1.52	-2.99	8.15	1889	0.97	1882
Somerset	Bristol	4.79	18	1.04	-3.75	9.02	1876	1.04	1890
<i>Michigan.</i>									
Kalamazoo	Kalamazoo	2.73	14	2.54	-0.19	5.77	1877	1.25	1882
Thornville	Lapeer	2.99	13	2.70	-0.29	4.90	1885	1.42	1882
<i>Minnesota.</i>									
Minneapolis	Hennepin	1.36	24	0.39	-0.97	4.13	1868	0.31	1878
<i>Montana.</i>									
Fort Shaw	Lewis & Clarke ..	0.43	30	0.61	+0.18	0.89	1880	0.01	1877
<i>New Hampshire.</i>									
Hanover	Grafton	3.80	38	1.71	-2.09	6.62	1885	0.59	1882
<i>New Jersey.</i>									
Moorestown	Burlington	3.46	27	0.98	-2.48	7.02	1889	0.98	1890
South Orange	Essex	3.77	20	0.78	-2.99	11.37	1889	0.78	1890
<i>New York.</i>									
Cooperstown	Otsego	3.07	36	3.17	+0.10	5.38	1858	1.45	1876
Palermo	Oswego	3.66	36	3.95	+0.29	6.60	1866	1.01	1882
<i>North Carolina.</i>									
Lenoir	Caldwell	3.52	18	0.00	-3.52	7.60	1877	0.00	1890
<i>Ohio.</i>									
N. Lewisburgh	Champaign	3.39	15	3.25	-0.14	5.75	1888	0.85	1884
Wauseon	Fulton	3.18	18	2.25	-0.93	5.83	1881	1.46	1884
<i>Oregon.</i>									
Albany	Linn	4.14	11	0.44	-3.70	8.40	1885	0.44	1890
Boila	Polk	4.32	20	1.42	-2.90	13.01	1877	1.42	1890
<i>Pennsylvania.</i>									
Dyberry	Wayne	3.35	19	1.68	-1.67	7.00	1886	1.40	1882
Grampian Hills	Clearfield	3.07	21	1.73	-1.34	6.03	1886	1.42	1872
Wellborough	Tioga	4.75	11	0.93	-3.82	9.07	1889	0.93	1890
<i>South Carolina.</i>									
Statesburgh	Sumter	1.97	9	0.90	-1.07	3.90	1882	0.87	1886
<i>Tennessee.</i>									
Austin	Wilson	3.99	20	1.57	-2.42	7.24	1874	1.57	1890
<i>Texas.</i>									
New Ulm	Austin	5.05	18	1.20	-3.85	14.93	1873	0.48	1887
<i>Vermont.</i>									
Stratford	Orange	3.60	17	2.00	-1.60	6.20	1888	0.50	1874
<i>Virginia.</i>									
Birdanest	Northampton ..	3.08	21	T.	-3.08	5.80	1885	T.	1890
<i>Washington.</i>									
Fort Townsend	Jefferson	2.79	15	0.96	-1.83	9.21	1874	0.39	1884
<i>Wisconsin.</i>									
Madison	Dane	2.02	21	1.93	-0.09	4.92	1896	0.53	1870

EXCESSIVE PRECIPITATION.

Precipitation to equal or exceed 10.00 was not reported for November, 1890.

In November of preceding years monthly precipitation to equal or exceed 10.00 has been reported for 21 years in Oregon; for 20 years in Wash.; for 12 years in Cal.; for 9 years in Miss.; for 7 years in Ala. and Mass.; for 6 years in N. Y.; for 5 years in Tex.; for 4 years in La.; for 3 years in Ark., Fla., Ga., Md., N. J., and N. C.; for 2 years in Del., Ind., Me., and N. H.; and for 1 year in Conn., Ky., Mich., Mo., Va., and Wis. In states and territories other than those named precipitation to equal or exceed 10.00 has not been reported for November. Among the heavier monthly rainfalls reported for November are: 31.93 at Crescent City, Cal., in 1885; 29.38 at Delta, Cal., in 1885; 27.60 at Neah Bay, Wash., in 1865; 24.75 at Fort Gaston, Cal., in 1865; 24.54 at Fort Gaston, Cal., in 1885; 24.12 at Georgetown, Cal., in 1875; 22.40 at Meadow Valley, Cal., in 1865; 22.21 at Fort Stevens, Oregon, in 1887; 20.89 at Point Pleasant, La., in 1877; 20.70 at Tatoosh Island, Wash., in 1869; and 20.51 at Downieville, Cal., in 1859. Exclusive of the instances and years cited monthly precipitation to equal or exceed 15.00 in November has been reported for 8 years in Wash.; for 7 years in Oregon; for 2 years in N. H.; and for 1 year in Ark., Fla., La., Me., and N. Y.

Precipitation to equal or exceed 2.50 inches in 24 hours was reported at 8 stations in La., and on 3 dates, the 15th to 17th; at 3 stations in Fla., and on 2 dates, the 28th and 29th; at 3 stations in Ky., and on 2 dates, the 15th and 16th; at 2 stations

in Miss., on the 16th; at 1 station in Ala., on the 17th; at 1 station in Ind. T., on the 14-15th; at 1 station in Kans., on the 14-15th; at 1 station in Mo., on the 14-15th; at 1 station in Ohio, on the 16-17th; at 1 station in Tenn., on the 17th; and at 1 station in Tex., on the 15th. Among the heavier rainfalls reported for this period are: 7.91, at Cheneyville, La., 15-16th; 5.00, at Lake Charles, La., 16th; and 4.08, at Central City, Ky., 15-16th.

In November of previous years precipitation to equal or exceed 2.50 in 24 hours has been reported for 16 years in La. and Tex.; for 14 years in N. C.; for 11 years in Mass. and Tenn.; for 10 years in Ala. and Ill.; for 9 years in Fla., Miss., and N. Y.; for 8 years in Ga. and Mo.; for 7 years in Ind. and N. J.; for 6 years in Conn., Kans., Ohio, Oregon, and Pa.; for 5 years in Ark., Cal., Iowa, Me., N. H., S. C., and Wash.; for 4 years in Mich.; for 3 years in Del., Ky., Md., R. I., and Va.; for 2 years in Colo. and Wis.; and for one year in Ariz., D. C., Ind. T., N. Mex., Vt., and W. Va. In states and territories other than those named precipitation to equal or exceed 2.50 in 24 hours has not been reported for November of preceding years. Among the heavier 24-hour rainfalls reported for November are: 10.39 at Fort Barrancas, Fla., 26th, 1878; 10.04 at San Luis Obispo, Cal., 17-18th, 1885; 7.10 at Point Pleasant, La., 20th, 1877; 7.00 at Marion, Ala., 6-7th, 1885; 7.00 at Melissa and Belmont Farm, Tex., 1st, 1877. Exclusive of the instances and years cited precipitation to equal or exceed 5.00 in 24 hours in November has been reported for 2 years in Tex.; and for one year in Fla., La. N. Y., N. C., Pa., and S. C.

Precipitation to equal or exceed 1.00 in one hour was reported at one station in Fla., on the 19th, and at one station in Miss., on the 16th. Remarkably heavy rainfall in one hour was not reported in November, 1890, and excessive rainfall for 5 and 10 minute periods is given in the table of "Maximum rainfall in one hour or less."

In November of preceding years precipitation to equal or exceed 1.00 in one hour has been reported for 6 years in Tex.; for 3 years in N. C. and Tenn.; for 2 years in Cal., Fla., Ind., Miss., and N. Y.; and for one year in Ala., D. C., Ga., Kans., Ky., Mich., Nebr., Pa., and Va. In states and territories other than those named precipitation to equal or exceed 1.00 in one hour has not been reported for November of preceding years. Among the heavier rainfalls reported for one hour or less in November are: 0.25 in 2 minutes, at New York City, 18th, 1886; 1.48 in 15 minutes, at Galveston, Tex., 5th, 1877; 1.82 in 20 minutes, at Vicksburg, Miss., 15th, 1879; 3.50 in 30 minutes, at Galveston, Tex., 2d, 1873.

Table of excessive precipitation, November, 1890.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch or more, in one hour.		
		Am't.	Day.	Am't.	Time.	Day.
<i>Arkansas.</i>	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	<i>A. M.</i>	
Forrest City	3.44	17				
<i>Florida.</i>						
Jupiter	2.70	29				
Key West	2.80	29		1.10	0 56	19
Mico	2.50	28, 29				
<i>Oklahoma Territory.</i>						
Oklahoma City	3.30	14, 15				
<i>Kansas.</i>						
Sedan	2.95	14, 15				
<i>Kentucky.</i>						
Canton	3.20	15, 16				
Central City	4.08	15, 16				
Princeton	3.00	16				
<i>Louisiana.</i>						
Alexandria	4.59	16, 17				
Cameron	2.80	16				
Cheneyville	7.91	15, 16, 17				
Farmerville	3.52	16				
Lake Charles	5.00	16				
Monroe	3.43	17				
Port Eads	4.22	17				
Shell Beach	2.50	16				
<i>Mississippi.</i>						
Logtown	3.00	16		3.00	2 00	16
Pearlington	3.00	16				

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Austin, <i>Missouri</i>	Inches.	Inches.		Inches.	A. M.	
Leipsic, <i>Ohio</i>		3.50	14, 15			
Covington, <i>Tennessee</i>		2.84	16, 17			
Columbia, <i>Texas</i>		2.60	17			
		3.06	15			

Received too late to be used in general discussion for November, 1890.

Homeland, <i>Florida</i>		2.75	29			
Hampton, <i>Iowa</i>		2.80	8			

Received too late for publication in October, 1890.

Corsicana (r), <i>Texas</i>		2.75	5, 6			
Tatoosh Island, <i>Washington</i>		13.69	4, 30	20		

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfall during November, 1890, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Bismarck, N. Dak.	Inch.		Inch.		Inch.	
Boston, Mass.	0.02	17	0.03	17	0.10	17
Buffalo, N. Y.	0.05	17	0.10	17	0.32	17
Cincinnati, Ohio	0.05	17	0.05	17	0.10	17
Chicago, Ill.	0.06	17	0.14	17	0.39	17
Cleveland, Ohio	0.06	17	0.14	17	0.39	17
Denver, Colo.	0.05	17	0.08	17	0.27	17
Detroit, Mich.	0.05	17	0.08	17	0.27	17
Dodge City, Kans.	0.02	8	0.05	8	0.20	8
Duluth, Minn.	0.02	18	0.04	18	0.17	18
Eastport, Me.	0.15	15	0.25	15	0.95	15
Galveston, Tex.	0.30	29	0.35	29	0.95	29
Jupiter, Fla.	0.30	29	0.35	29	0.95	29
Key West, Fla.	0.11	15	0.15	15	0.35	15
Marquette, Mich.	0.11	15	0.15	15	0.35	15
Memphis, Tenn.	0.11	15	0.15	15	0.35	15
New York City	0.11	15	0.15	15	0.35	15
New Orleans, La.	0.11	15	0.15	15	0.35	15
Norfolk, Va.	0.11	15	0.15	15	0.35	15
Philadelphia, Pa.	0.11	15	0.15	15	0.35	15
Philadelphia Water Works	0.11	15	0.15	15	0.35	15
Portland, Oregon	0.11	15	0.15	15	0.35	15
Saint Louis, Mo.	0.05	8	0.12	8	0.23	8
Saint Paul, Minn.	0.05	8	0.12	8	0.23	8
San Diego, Cal.	0.05	7	0.05	7	0.20	7
San Francisco, Cal.	0.05	7	0.05	7	0.20	7
Savannah, Ga.	0.05	13	0.05	13	0.20	13
Washington City	0.05	13	0.05	13	0.20	13
Wilmington, N. C.	0.05	14	0.05	14	0.08	13

* Not sufficient to register. † Rain-gauge not working. ‡ Less than .05 in 1 hour. § No record on account of snow.

SNOW (snowfall in inches and tenths).

The first snow of the season was reported as follows: 1st, Royalston, Mass.; Massena and Rochester, N. Y.; Edinborough, Pa.; Madison, Wis. 2d, Hampton, Iowa; Willow Springs, Mo.; Cockerell and Oswego, Ill.; Dubuque, Iowa; Albany, N. Y.; Wooster, Ohio; Nisbet and Tipton, Pa.; Cadiz and La Crosse, Wis. 4th, Eastport, Me.; Harrisburg, Philadelphia, Quakertown, and Salem Corners, Pa.; Beverly, N. J.; Fort Niagara and Fort Porter, N. Y. 5th, Susanville, Cal.; Carson, Iowa; Fort Missoula, Mont.; Spearfish, S. Dak.; Richmond, Va.; Fort McKinney, Wyo. 6th, Sierra Nevada Mountains (near Keeler), and mountains near Red Bluff, Cal.; Toro Mountains (near Salinas, Cal.); Montevideo, Minn.; Millbank, Huron, and Rapid City, S. Dak. 7th, Alta, Bancroft, Cresco, Osage, and Stilson, Iowa; Morris and Orton-

ville, Minn.; Princeton, Mo.; Glendive, Mont.; Valentine and North Platte, Nebr.; Chama and Estalina Springs, N. Mex.; Oxford, Turin, Lebanon Springs, Setauket, and Honey-mead Brook, N. Y.; Lossee, Utah. 8th, Fort Grant, Payson, hills near Simmons, Ariz.; Vinton, Webster City, Clinton, West Bend, Des Moines, Belle Plaine, Blakeville, Carroll, Cedar Rapids, Carson, Clarinda, Eagle Grove, Indianola, Grinnell, Maquoketa, Monticello, Osage, and Panama, Iowa; Minneapolis, Minn.; mountains near Omaha, De Soto, and Genoa, Nebr.; Santa Fe, Fort Marcy, and Embudo, N. Mex.; Wahpeton, N. Dak.; Kimball, S. Dak.; Lincoln and Wauzeka, Wis. 9th, Strawberry, Ariz.; Kansas City, Mo.; Onida, S. Dak. 11th, Manchester, N. H.; Portland, Me.; Wood's Holl, Amherst, Westborough, and Worcester, Mass. 12th, Holbrook and Springerville, Ariz.; New Haven, Conn.; Cornish, Me. 13th, Fort Apache, Ariz.; Palermo, N. Y. 14th, Fort Stanton and Gallinas Springs, N. Mex. 15th, Albert, Fort Union, Hillsborough, and Hill's Ranch, N. Mex.; Hartley, Tex. 16th, Dodge City, Allison, Gove City, and Lakin, Kans. 17th, Shields, Kans.; Plattsburgh Barracks, N. Y. 18th, Kennebec Arsenal, Me. 19th, Cooperstown, N. Y.; Mount Alto, W. Va. 20th, Atlantic City, Vineland, and Moorestown, N. J.; New Hartford, Conn.; Hanover, N. H.; Phoenixville, Troy, and York, Pa.; Burlington, Vt. 22d, Minden, Conn.; Fall River, Mass. 23d, Boston, Nantucket, Dudley, Fort Warren, and Taunton, Mass.; New London and Hartford, Conn.; New York City and Rondont, N. Y.; Kingston, R. I. 26th, Milton, Mass. 27th, Washington City; Vineyard Haven and Brewster, Mass.; Egg Harbor City, N. J.; Fort Columbus and Fort Schuyler, N. Y.; Shiloh and Tiffin, Ohio; Westtown, Pa. 28th, New Brunswick, N. J. 30th, Mount Sterling, Ky.

A general snow storm prevailed over the Dakotas, Minnesota, Nebraska, and northwest Iowa on the 8th. This was the first heavy snow of the season in that region. Snow fell generally in central and western New York the evening and night of the 22d.

Snowfalls of five inches or more were reported as follows, and in states and territories where the maximum depth was below that amount, the station reporting the greatest is given: *Arizona*.—Springerville, 8; Woodruff, 5. *California*.—Susanville, 3.5. *Colorado*.—Cumbres, 27; Stamford, 21.5; Breckenridge, 15; Smoky Hill Mine, 14; Box Elder, 12; Como (near), 10.3; Canon City, 8; Elkhorn, 7.5; Bennet and San Luis, 7; Alma, Dillon, and Moraine, 6.5; Westcliffe, 6.2; Amherst and Georgetown, 6; Le Roy, Wray, and Yuma, 5. *Connecticut*.—Falls Village, 4. *Delaware*.—Dover, trace. *District of Columbia*.—Washington City, trace. *Idaho*.—Mullan, 5. *Illinois*.—Belvidere, 1.8. *Indiana*.—Angola, 1.1. *Iowa*.—Sac City, 4. *Kansas*.—Lakin and Monument, 3. *Kentucky*.—Shelbyville, trace. *Maine*.—Fairfield and Mayfield, 6. *Maryland*.—Baltimore and Woodstock, trace. *Massachusetts*.—Gilbertville, 4. *Michigan*.—Marquette, 20; Atlantic, 13; Calumet, 12.2; Cheboygan, 9.7; Lathrop, 8.5; Berrien Springs, 8; Fort Mackinac, 7.8; Harrison, 7.5; Crystal Falls, 6.8; Caldwell, 6; Charlevoix, 5. *Minnesota*.—Pokegama Falls, 9; Duluth, 8.5; Lake Winnibigoshish, 7.4; Fort Snelling, 7.2; Leech Lake, 6.5; Pine River, 5.8; Red Wing, 5.2; Farmington, Fort Ripley, Le Sueur, and Ortonville, 5. *Missouri*.—Kansas City, Pickering, Princeton, and Saint Joseph, trace. *Montana*.—Fort Shaw, 7; Choteau, 5. *Nebraska*.—Kimball, 10; Valentine, 8.1; Bassett and Crete, 8; Gering, 6.4; Hay Springs and Palmer, 6; Fort Niobrara and Kennedy, 5. *Nevada*.—Pioche, 6; Belmont, 5. *New Hampshire*.—Berlin Mills, 7. *New Jersey*.—Oceanic, 0.3. *New Mexico*.—Estalina Springs, 8.8; Chama, 8; Santa Fé, 7.6; Fort Stanton, 7; Fort Marcy and Hillsborough, 5. *New York*.—Utica, 13; Brookfield and Quaker Street, 12; Chittenango, 10.8; Arcade, 8.9; Bethlehem Centre and Coopers-town, 8; Schodack Depot and Turin, 7; Perry City, 5.1; Malone, 5. *North Dakota*.—Wahpeton, 4. *Ohio*.—Wheeler, 5.2. *Oregon*.—Joseph, 2.5. *Pennsylvania*.—Blue Knob, 5.5.

Rhode Island.—Bristol, Kingston (2), Lonsdale, and Pawtucket, trace. *South Dakota*.—Fort Meade, 12; Webster, 9; Kimball, 6.5; Fort Sully, 6.2; Fort Randall, 6; Fort Bennett, 5.8; De Smet, Onida, and Yankton, 5.5; Wolsey, Alexandria, Flandreau, Howard, and Woonsocket, 5. *Tennessee*.—Greeneville and Nunnally, trace. *Texas*.—Hartley, 3. *Utah*.—Taylor's Ranch, 9. *Vermont*.—East Berkshire, 6. *Virginia*.—Richmond, trace. *West Virginia*.—Tyler's Creek, 1.1. *Wisconsin*.—Green Bay, 9.2; Koepenick, 7.6; Phillips, 7.2; Chipewewa Falls, Grantsburgh, Greenwood, 7; Medford (1), 5.5; Peshtigo, 5.3; Embarrass, 5.2; Lincoln, 5. *Wyoming*.—Camp Pilot Butte, 5.4; Cheyenne, 5.

The greatest depth of snowfall reported was 27.0, at Cumbres, Colo. At Marquette, Mich., 20.0 fell. At elevated stations in central Colo. the snowfall exceeded 15.0. It exceeded 10.0 in extreme north upper Mich., southwest Nebr., central N. Y., and west-central S. Dak.; and equalled or exceeded 5.00 in east-central Ariz., north Idaho, west-central Me., central and southwest lower Mich., a greater part of Minn., west-central Mont., north Nebr., east-central and central Nev., north N. H., central and west N. Mex., south-central Pa., northeast Ohio, generally in S. Dak., in central Utah, north Vt., north Wis., and south Wyo. Trace of snowfall was reported north of a line traced from south N. J. irregularly west-southwest to north-central Tenn., thence irregularly northward to east Iowa, thence southwestward to southeast Ariz., thence northwestward over east Cal. to north-central Cal., and thence northeastward to north Idaho.

DEPTH OF SNOW ON GROUND AT CLOSE OF MONTH.

Chart IV shows the depth of snow reported on the ground

at the close of the month. The greatest depth of snow reported was 15.0, at Cumbres, Colo.; 8.0 was reported at Marquette, Mich.; 3.0 in central N. Y.; 2.0 in north Wis., north Minn., and central Colo.; 1.0 in north Vt. and north N. H.; and trace north of a line traced from north N. H. southwestward to central Ohio and thence northwestward to northeast Mont., at elevated stations in the east part of the plateau regions as far south as east-central Ariz., in northeast south Idaho, and north-central Oregon.

HAIL.

Hail was reported as follows: 1st, Mich., Wis. 2d, Mich., Ohio, Pa. 3d, Ind., Mich., Ohio. 7th, Ariz., Colo. 8th, Ill., Ind., Miss., Wis. 9th, Vt., Wis., Wyo. 10th, Tex. 11th, Conn., N. J., N. Y. 12th, Pa. 13th, Ariz., Mont. 14th, N. Mex. 15th, Conn. 19th, N. J., N. Y., Pa. 20th, Md., N. J., Pa. 21st, N. Mex. 22d, Utah. 25th, Pa. 27th, N. Mex., Va. 30th, Wis.

SLEET.

Description of the more severe sleet storms of the month is given under "Local storms." Sleet was reported as follows: 1st, Mich., N. Y. 2d, Mich., N. Y., Ohio, Va. 3d, Ill., Mich., N. Y., Ohio, Tenn., Vt. 4th, Mich., N. Y. 5th, Va. 7th, Ariz., Iowa, Kans., Nebr. 8th, Ill., Iowa, Kans., Minn., Mo., Nebr., N. Mex., N. Y., Ohio, Wis. 9th, Iowa, Me., Wis. 10th, N. Y., Ohio, Wis. 11th, Conn., Mass., N. H., N. Y., Ohio. 12th, Conn., N. Y., Pa. 16th, Nebr. 17th, Vt. 19th, N. Y., Ohio, Pa. 20th, N. Y. 21st, N. Mex. 22d, N. Y., N. Mex. 23d, Conn., N. Y. 24th, Tenn. 25th, Nebr., N. Y., S. Dak. 26th, Mo., N. Y. 27th, Mich. 29th, Vt. 30th, N. Y., Ohio, Tenn., Wis.

WINDS.

The prevailing winds during November, 1890, are shown on chart 11 by arrows flying with the wind. In New England, the middle Atlantic states, the lower lake region, the Missouri Valley, and on the northeast slope of the Rocky Mountains the winds were generally from southwest to northwest; on the coast of the south Atlantic states, and on the north Pacific coast, from north to east; over Florida from northeast to east; in the east and west Gulf states from northwest to northeast; in the lower Rio Grande valley and on the middle Pacific coast from northwest to north; in the Ohio Valley, the upper lake region, and the upper Mississippi valley from south to west; in the extreme northwest from the northwest; on the middle-eastern slope of the Rocky Mountains from southwest to north; on the southeast slope of the Rocky Mountains from south to southwest; on the south Pacific coast from west to northwest; and in Tennessee, and over the plateau regions, variable.

HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Signal Service, as follows: 2d, 52, sw., at Buffalo, N. Y. 9th, 62, sw., at Cleveland, Ohio. 12th, 52, sw., at Fort Assiniboine, Mont. 18th, 54, se., at Wood's Holl, Mass. 20th, 55, nw., at Kitty Hawk, N. C. 22d, 54, sw., at El Paso, Tex. 24th, 50, n., at Wood's Holl, Mass. 29th, 52, nw., at Key West, Fla.; 52, ne., at Titusville, Fla.

LOCAL STORMS.

On the 2d a severe storm with sleet began at Oswego, N. Y., at 5.13 p. m. and ended 10.33 p. m., during which the wind attained a velocity of 36 miles per hour from the nw. and sw. Three schooners, bound for Toronto, were driven back, and one schooner went ashore near the Life Saving Station. At Buffalo, N. Y., the gale was the severest of the season; it set in at 12.10 p. m.; reached a velocity of 52 miles from the sw., and continued until 7.20 p. m. The inner and outer breakwaters were submerged, but no disasters occurred. At Alpena, Mich.,

a brisk n. wind, with snow, began 5.30 a. m. and lasted until 5.10 p. m. A schooner valued at \$10,000 was wrecked on Middle Island, 18 miles ne. of Alpena, but the crew was saved. At Marquette, Mich., a severe wind, with snow, prevailed, and a number of vessels lost their deck load of lumber. On the 3d a west gale, with heavy snow, prevailed at Grand Haven, Mich., in the evening. A heavy sea was running in the lake, and many vessels were driven into the harbor. On the 5th a severe storm prevailed on the lake at Alpena, Mich.; a schooner went aground on North Point, about 15 miles north of Alpena. At Marquette, Mich., the wind reached a velocity of 44 miles per hour from the sw. On the 6th a heavy gale prevailed at Green Bay, Wis., and a very heavy sea was running on the bay and lake. On the 7th high winds, with rain, prevailed at Fort Bowie, Ariz., in the early morning; a tin roof was blown off, telegraph lines were prostrated, etc. A heavy sleet storm began at Concordia, Kans., in the evening, causing damage to trees. On the 9th a heavy gale, with rain, began at Cleveland, Ohio, at 7.31 a. m. and continued until 12.18 p. m., during which a wind velocity of 62 miles was reached. At Healdton, Ind. T., a heavy wind storm in the early morning damaged buildings and uprooted trees. On the 11th and 12th a high "norther" prevailed in California, and in places the wind reached 60 miles per hour. Near Los Angeles heavy north winds prevailed off the coast. A tug boat and lighter were driven ashore on Catalina Island and wrecked, and one man was drowned. The wind was very severe in the valleys, where damage was reported to the orange crop. Considerable electrical energy was displayed during the gale, and the wood work surrounding the switch-board in the Western Union Telegraph office at Los Angeles was set on fire by sparks. On the 15th a severe wind from the sw. prostrated trees and fences and damaged ungathered cotton at Fayette, Miss. On the 16th great havoc was done by high winds and heavy rain in Louisiana; fences and out-houses were blown down, and large quantities of rice, cotton, and cane were destroyed.

On the 17th, at 5 p. m., a tornado was reported as having

formed near the Catholic Cemetery, about 4 miles from Erie, Pa. It moved rapidly eastward a distance of about 3 miles in a path about one-half mile wide. Eleven large trees, within a distance of 100 feet, were twisted off, leaving the stumps standing; one of the trees was 3 feet in diameter. A large cucumber tree, 95 feet high, standing alone in a field, was torn up by the roots. Fence rails were blown about like straws, and shocks of corn were carried up. The instruments at the Signal Office in Erie indicated a marked disturbance, and two special observations were taken. The clouds were low and of a gray, angry appearance, and their movement was cyclonic. The rainfall at Erie was 1.12 inch. The tornado was attended by a deep roaring sound. No lives were lost. On the 19th a heavy hail storm, with high winds, caused considerable damage in the Wyoming Valley, Pa. At Key West, Fla., a fresh se. wind began at midnight, 28th, and veered to sw. at 4 a. m., 29th, after which it began to increase in force until 9.10 a. m., when a velocity of 38 miles per hour was reached, with barometer at 29.83. At 11.25 a. m. the wind jumped to nw., and at 11.55 a. m. attained a velocity of 52 miles per hour; one mile being registered at the rate of 60 miles per hour at 11 a. m.

This was the highest velocity recorded for November at Key West since the establishment of that station in 1870. Strong nw. wind continued during the afternoon, and at midnight it was blowing 36 miles per hour. The 29th opened overcast, with cumulo-stratus clouds, which soon began to break; partly cloudy weather followed. At 11 a. m. the "norther" cloud-bank was observed approaching, and it passed over the station at 11.25 a. m. Weather cloudy and threatening throughout the afternoon, with light rain from 7.20 to 7.35 a. m., and from 8 to 8.15 p. m. As the wind veered to nw. the barometer commenced to rise rapidly, and at 8 p. m. stood at 29.97. The following casualties occurred during the storm: The s. s. "Alamo" in endeavoring to get to her wharf was forced into the U. S. Lighthouse s. s. "Laurel," which sustained damage to the extent of \$300. Smaller vessels dragged their anchors, but none were materially injured. At Jupiter, Fla., a heavy rain storm, with thunder and lightning, began at 4.50 a. m., 29th, and continued at intervals during the day. Some damage was done to crops, and oranges and other fruit suffered. Incoming steamers reported navigation very difficult owing to the high winds.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-point at the several stations; the highest and lowest water during November, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark. November, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	30	14.8	14	3.8	11.0
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	20	17.1	9, 10	2.6	14.5
Little Rock, Ark.	23.0	21	19.7	8, 9, 10, 11	5.7	14.0
<i>Missouri River.</i>						
Fort Buford, N. Dak.	21.0	3	0.5	10, 14, 15, 16	0.1	0.4
Kansas City, Mo.	21.0	18	5.6	1	4.9	0.7
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.5	1, 4	2.3	29, 30	1.0	1.3
La Crosse, Wis.	13.0	1	4.3	30	2.9	1.4
Dubuque, Iowa.	10.0	1	5.8	22, 28, 29, 30	3.7	2.1
Davenport, Iowa.	15.0	1	4.2	30	2.4	1.8
Keokuk, Iowa.	14.0	1	4.5	29, 30	2.2	2.3
Saint Louis, Mo.	32.0	23, 24	8.9	13, 14, 15, 16	6.3	2.6
Cairo, Ill.	40.0	25	24.3	15	14.1	10.2
Memphis, Tenn.	34.6	27	18.5	16	11.2	7.3
Vicksburg, Miss.	41.0	30	26.6	1	16.4	10.2
New Orleans, La.	13.0	30	7.9	1	4.8	3.1
<i>Ohio River.</i>						
Pittsburgh, Pa.	22.0	19	12.8	29, 30	4.2	8.6
Parkersburg, W. Va.	38.0	21	18.7	30	7.4	11.3
Cincinnati, Ohio.	50.0	19, 20	31.5	13	16.5	13.0
Louisville, Ky.	25.0	19, 20	12.5	12, 30	8.2	4.3
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	31	11.4	15	3.2	8.2

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Tennessee River.</i>						
Chattanooga, Tenn.	13.0	1	6.8	30	2.4	4.4
<i>Monongahela River.</i>						
Pittsburgh, Pa.	29.0	19	12.8	29, 30	4.2	8.6
<i>Savannah River.</i>						
Augusta, Ga.	32.0	1	8.2	25, 26	6.8	1.4
<i>Willamette River.</i>						
Portland, Oregon.	15.0	17	2.4	7	0.5	2.9

ICE IN RIVERS AND HARBORS.

Mississippi River.—Red Wing, Minn., 10th, thin ice, the first of the season, covered the river. Saint Paul, Minn., 9th, small pieces of floating ice in the river.

Missouri River.—Fort Buford, N. Dak., 9th to 14th, floating ice in the river. Scranton, S. Dak., 8th, anchor ice in the river. Fort Sully, S. Dak., 10th, running ice in the river; navigation closed on 11th.

At Duluth, Minn., thin ice formed on the Superior side of the Bay on the 8th. On the 27th and 28th ice interrupted navigation on the Erie Canal in east-central New York.

FLOODS.

Floods and high water were reported along the Gila and Colorado rivers in west Arizona on the 8th.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 1st, Mount Saint Mary's, Md. 2d, Fort Buford, N. Dak. 3d, La Fayette, Ind. 5th, Mount Saint Mary's, Md. 6th, Huron, S. Dak.; Mount Saint Mary's, Md.; Meadville, Pa. 7th, New Hartford, Conn.; Alta, Bancroft, Cresco, Osage, and Stilson, Iowa; Barren Creek Springs and Mount Saint Mary's, Md.; Amherst, Cambridge, Concord, Dudley, Leicester, North Billerica, and Somers, Mass.; Red Wing, Saint Paul, Saint Vincent, and Sheldon, Minn.; Choteau and Fort Assiniboine, Mont.; Kennedy and North Loup, Nebr.; Antrim and Nashua, N. H.; Egg Harbor City, Madison, Rancocas, and Readington, N. J.; New Lisbon, N. Y.; Bismarck, Fort Buford, Fort Yates, and New England City, N. Dak.; Eagle's Mere, Le Roy, and

Westtown, Pa.; Block Island, R. I.; Scranton and Webster, S. Dak.; Embarrass, Green Bay, and Peshtigo, Wis. 13th, Voluntown, Conn.; Eastport Me.; Amherst, Mass.; Alpena and Thornville, Mich.; Palermo, N. Y.; Eagle's Mere and Le Roy, Pa.; Block Island, R. I.; Huron, S. Dak.; Northfield, Vt.; Grantsburgh, Wis. 14th, Saint Vincent, Minn.; Rondout, N. Y. 15th, Fort Buford, N. Dak. 16th, Webster, S. Dak. 19th, Mount Saint Mary's, Md. 21st, Austin, Mo. 25th, 26th, and 29th, Mount Saint Mary's, Md.

On the 7th auroras were observed in the Atlantic coast states from New Hampshire to Maryland, and in Wisconsin, Minnesota, Iowa, Nebraska, the Dakotas, and Montana.

Fort Buford, N. Dak., 2d: an aurora was observed at 12.31 a. m., consisting of streamers rising from altitude about 15°

to about altitude 75° , and extending over about 75° of azimuth between northwest and northeast. These streamers were in continual motion, and their color from the base, part way up, was of a lemon shade tinged with red on the outer edges; the most easterly was red and more stationary. The dark base usually observed in an auroral display was absent. The streamers disappeared at 12.55 a. m.

Concord, Mass., 7th: a brilliant aurora was observed in the evening, which attained its greatest brilliancy at 8.50 p. m. It was composed of bright yellow streamers and dark purple waves, moving in rapid succession from west to east. The waves were visible only 6 minutes, but the streamers continued bright for $2\frac{1}{2}$ hours.

Fort Yates, N. Dak., 7th: a brilliant aurora, consisting of an arch extending from about 120° to 250° of azimuth, and reaching nearly to the zenith, was observed at 8 p. m. Light streamers reaching altitude 40° to 45° were observed in the lower portion of the arch. The display lasted until nearly midnight.

Green Bay, Wis., 7th: a brilliant aurora was observed at 7.45 p. m. It consisted of an arch of white light extending from about 135° to 225° azimuth. The crown of the arch reached altitude about 20° . The base of the arch, which was of a dull ruddy hue, was about 1° in width, and the dark segment was of inky blackness. At 8.10 p. m. the "merry dancers" made their appearance, and in a few seconds about 100 of them were in incessant motion, reaching the zenith at times. At 8.20 p. m. these changed to curtain-like appearances which swayed to and fro, folding and unfolding like banners.

Fort Buford, N. Dak., 7-8th: an aurora was observed at 7.40 p. m., 7th. It consisted of a narrow band of light grey color at altitude about 20° , and extended from nw. to ne. The band gradually increased in width and extended from nw. to due e., varying in altitude from 25° to 60° . At times there were two distinct arches and again these would form one sheet of grey light through which waves of white would pass. Stream-

ers of white, at times slightly tinged on the outer edge with red, were first observed at 10.56 p. m.; these would only be visible for short periods. The dark segment was observed at intervals, irregular in form, at times just above the horizon, and again at 7° altitude. Patches of aurora, similar to illuminated clouds, were observed south of the zenith. The most noticeable feature of the aurora was observed at about 12.10 a. m., 8th, when the whole northern horizon was covered with streaks of an olive green color, interspersed with dark spaces.

Saint Vincent, Minn., 7-8th: an aurora was observed at 9.30 p. m., 7th, in the form of three well-defined arches extending from east to west along the northern horizon. These bands were of a whitish color, the width of each being about that of an ordinary rainbow. When first observed the sky was partly cloudy and the bands were somewhat obscured, but by midnight the clouds disappeared and the bands had attained their maximum brilliancy and were still of the same whitish color. The display lasted until 1.45 a. m., 8th.

THUNDER-STORMS.

Thunder-storms were reported as follows: east of the Rocky Mountains thunder-storms were reported in the greatest number of states, 6, on the 8th; in 5 on the 9th; in 4 on the 2d, 15th, and 16th; in 3 on the 7th and 14th; in 2 on the 3d, 11th, and 19th; and in 1 on the 10th, 12th, 13th, 17th, 23d, 25th, 28th, and 29th. The 1st, 4th, 5th, 6th, 20th, 21st, 22d, 24th, 26th, 27th, and 30th, were the only dates on which thunder-storms were not reported.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 8, in Tex.; on 7 in Fla.; on 6 in Kans.; on 3 in La. and Pa.; on 2 in Ark., Ind. T., Minn., Miss., and Tenn.; and on 1 in Ala., Ill., N. J., N. Y., N. C., and Ohio. West of the Rocky Mountains thunder-storms were reported as follows: Ariz., 7th; Cal., 12th; N. Mex., 6th. In states and territories other than those named no thunder-storms were reported.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Haverford College Observatory, Pa., (observed by Prof. F. P. Leavenworth):

Date.	Number of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculae.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
Nov., 1890.										
1, 11 a. m.	1	1	0	0	0	0	2	2	3	1 large spot; near edge.
3, 9 a. m.	0	0	1	1	0	0	0	0	0	Definition fair.
4, 10 a. m.	1	1	0	0	0	0	1	1	1	Definition fair; veiled spot.
5, 10 a. m.	0	0	0	0	0	0	0	0	0	Definition good.
6, 11 a. m.	0	0	0	0	0	0	0	0	0	Definition fair.
7, 12 m.	1	6	0	0	0	0	1	6	1	Definition good; on edge; 1 large spot.
8, 11 a. m.	0	4	0	0	0	0	1	4	1	Definition fair; 1 large spot.
10, 10 a. m.	0	0	0	0	0	0	1	5	1	Definition poor.
13, 2 p. m.	2	2	0	0	0	0	3	5	0	Definition good.
14, 10 a. m.	0	0	0	0	0	0	1	3	1	Definition good.
15, 10 a. m.	0	0	0	0	0	0	0	0	3	Definition fair.
19, 10 a. m.	0	0	0	0	0	0	0	0	2	Definition fair.
20, 12 m.	0	0	0	0	0	0	0	0	2	Definition fair.
21, 10 a. m.	1	1	0	0	1	1	1	1	3	Definition fair.
22, 10 a. m.	0	3	0	0	0	3	1	4	3	Definition poor; 1 large spot.
23, 10 a. m.	0	15	0	0	0	0	1	19	1	Definition fair; 1 large spot.
24, 10 a. m.	0	46	0	0	0	0	1	65	1	Definition fine; 1 large spot.
25, 10 a. m.	0	0	0	0	0	0	1	47	1	Definition good; 3 large spots.
26, 12 m.	0	0	0	0	0	0	1	53	0	Definition fair; 4 large spots.
27, 12 m.	0	0	0	0	0	0	1	35	2	Definition poor.
28, 11 a. m.	0	0	0	0	0	0	1	30	2	Definition poor.
29, 10 a. m.	0	0	0	0	0	0	1	65	3	Definition good; 2 large spots.
30, 3 p. m.	1	1	0	0	0	0	2	29	1	Definition good; 1 large spot.

Mr. D. E. Hadden, Alta, Iowa: 9th, 1 group, 3 spots se., with faculae. 10th and 11th, 1 group, 3 spots. 12th and 13th, 1

group, 2 spots; spots small. 17th, small faculae on e. limb; groups of faculae near se. and w. limbs. 18th, faculae se.; seen through clouds. 19th, small faculae in se. 22d, 1 group, 2 spots; group on e. limb, with faculae. 23d, 1 group, 5 spots; 1 large spot; large area of faculae surrounding group. 24th, 1 group, 7 spots; 1 spot large. 25th, 4 groups in north latitude. 26th, 4 groups, 19 spots; 3 very large spots each with umbra and penumbra. 27th, 4 groups, 12 spots; groups near together. 28th, 4 groups, 15 spots; 1 large spot with umbra and penumbra. 29th, 4 groups, 11 spots; large spot unchanged; groups diminishing in size. 30th, 3 groups ne.; hazy; could not count small spots; small faculae on e. limb. Cloudy 2d, 6th to 8th, and 16th.

Mr. John W. James, Riley, Ill.: none seen until 10th, then 3 spots near sun's meridian; vanished 14th. 22d, 2 spots surrounded by very prominent faculae near e. limb. 23d, prominent faculae near e. limb. These soon formed 3 groups of small spots, and 1 large spot, the latter on sun's meridian 28th. 26th, 25 small spots.

Mr. C. E. Buzzell, Leaf River, Ill.: 1st to 3d, cloudy. 4th to 5th, clear disc. 6th to 9th, cloudy. 10th, groups; spots first observed, 3 days in; unchanged 13th. 14th, definition poor. 15th to 17th, cloudy. 18th to 20th, no spots. 19th, faculae prominent. 22d, extensive groups, 1 day in, which remained unchanged until 28th. 29th, largest group closing up. 30th, cloudy.

Mr. H. D. Govey, North Lewisburgh, Ohio: sun spots were observed on the 11th, 12th, 13th, 24th, 28th, and 29th.

DROUGHT.

At Milledgeville, Ga., trace, only, of rain fell during the month. At Weldon and Hendersonville, N. C., the month

was very dry. At Staunton and Stanardsville, Va., the month was unusually dry. At Woodbury, N. J., the month was the driest November in 5 years. At Charleston, Ill., the ground was very dry, and water scarce in creeks and wells. At Shreveport, La., the drought was broken on the 9th. At Fort Madison, Iowa, the month was very dry, and water for stock scarce. At Fayette, Mo., no rain fell after the 17th, and ponds and creeks were dry. At Red Bluff, Cal., rain was needed, the drought becoming severe by the 25th. At Grass Valley,

Cal., the month was very dry; no rain falling. At McMinnville, Oregon, the month was so dry that farmers were unable to plow.

PRAIRIE FIRES.

Near Webster, S. Dak., hundreds of tons of hay were destroyed by prairie fires from the 1st to 4th. On the 16th and 17th prairie fires destroyed hay and grain south of Fort Pembina, N. Dak.

VERIFICATIONS.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

FORECASTS FOR 24 HOURS IN ADVANCE.

The forecasts for districts east of the Rocky Mountains for November, 1890, were made by Assistant Professor H. A. Hazen, Signal Service, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant John P. Finley, Signal Corps.

Percentages of forecasts verified, November, 1890.

States.		States.	
Maine.....	82.4	Kentucky.....	85.0
New Hampshire.....	81.5	Ohio.....	79.1
Vermont.....	81.0	West Virginia.....	87.1
Massachusetts.....	81.5	Indiana.....	85.5
Rhode Island.....	85.9	Illinois.....	87.9
Connecticut.....	78.8	Lower Michigan.....	85.0
Eastern New York.....	80.3	Upper Michigan.....	77.1
Western New York.....	75.6	Wisconsin.....	87.8
Eastern Pennsylvania.....	85.2	Minnesota.....	87.5
Western Pennsylvania.....	82.7	Iowa.....	88.3
New Jersey.....	89.9	Kansas.....	85.1
Delaware.....	89.5	Nebraska.....	85.1
Maryland.....	88.4	Missouri.....	85.5
District of Columbia.....	88.1	Colorado.....	88.9
Virginia.....	85.3	North Dakota.....	85.7
North Carolina.....	90.0	South Dakota.....	86.7
South Carolina.....	90.4	Southern California*.....	95.9
Georgia.....	92.0	Northern California*.....	94.3
Eastern Florida.....	85.0	Oregon*.....	92.5
Western Florida.....	93.1	Washington*.....	88.1
Alabama.....	93.7	By elements: Weather.....	88.8
Mississippi.....	90.2	Temperature.....	82.4
Louisiana.....	92.2	Monthly percentage of weather and	
Texas.....	87.6	temperature combined.....	86.2
Arkansas.....	89.9		
Tennessee.....	87.9		

* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The forecasts of temperature in districts east of the Rocky Mountains for November, 1890, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. ‡ The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

FORECASTS FOR 48 AND 72 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public the Chief Signal Officer has authorized forecasts for 48 and 72 hours, covering the 2d and 3d days in advance. These are optional with the forecast official, and are only made when clearly in the public

interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 254; temperature, 78. Percentages of verifications: weather, 94.6; temperature, 86.7; weather and temperature combined, 93.3.

Percentages of verifications of forecasts made for third day in advance. Number of predictions made: weather, 12; temperature, 7. Percentages of verifications: weather, 95.0; temperature, 18.6; weather and temperature combined, 73.6.

WIND SIGNALS FOR NOVEMBER, 1890.

Statement showing percentages of justifications of wind signals for the month of November, 1890:

Wind signals.—(Ordered by Assistant Prof. H. A. Hazen). Total number ordered, 106; justified as to velocity, wholly, 79, partly, 3; justified as to direction, 99. Of the signals ordered 99 were cautionary, of which 74 were wholly, and 1 partly justified; and 7 were storm signals, of which 5 were wholly, and 2 partly justified. 21 signals were ordered for easterly winds, of which 16 were justified, and 85 were ordered for westerly winds, of which 83 were justified. Percentage of justifications, 69.9.

COLD-WAVE SIGNALS AND TEMPERATURE FALL WARNINGS.

[Ordered by Assistant Prof. T. Russell.]

Number of cold-wave signals ordered, 60; justified, 16. Percentage of justifications, 26.7. Number of temperature fall warnings, 6. Percentage of justifications, 100. Percentage of justifications of cold-wave signals and temperature-fall warnings combined, 30.2.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for November, 1890.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Iowa.....	95	94	Nebraska.....	94	92
Illinois.....	87	81	New Jersey.....	89	83
Kansas.....	84	90	North and South Dakota....	92	87
Michigan.....	90	90	Ohio.....	92	93
Minnesota.....	86	76	Pennsylvania.....	85	87

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for November, 1890, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 4.4 above the normal; maximum, 85, at Citronelle, 1st and 12th; minimum, 23, at Valley Head, 1st and 4th; greatest monthly range, 59, at Valley Head; least monthly range, 39, at Union Springs.

Precipitation.—The average was 3.25 below the normal; greatest monthly, 1.79, at Uniontown; least monthly, 0.00, at Bermuda and Columbiana.

Wind.—Prevailing direction, northwest.—Prof. P. H. Mell, Auburn, director; J. M. Quarles, Private, Signal Corps, assistant.

ARKANSAS.

Temperature.—The mean was 3.8 above the normal; maximum, 84, at Rus-

sellville, 12th; minimum, 25, at Devall's Bluff, 27th; greatest monthly range, 54, at Russellville and Lead Hill; least monthly range, 38, at Ozone.

Precipitation.—The average was about the normal for the last 8 years; greatest monthly, 7.10, at Harrisburgh; least monthly, 2.85, at Camden.—M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Sergeant, Signal Corps, assistant.

COLORADO.

Temperature.—The mean was 3.5 above the normal; maximum, 88, at River Bend, 17th; minimum, —20, at Breckenridge, 15th; greatest monthly range, 100, at Breckenridge; least monthly range, 30, at Kit Carson.

Precipitation.—The average was 0.20 below the normal; greatest monthly, 2.70, at Cumbres; least monthly, 0.00, at a number of stations.
Wind.—Prevailing direction, west.—*W. S. Miller, Sergeant, Signal Corps, Colorado Springs, assistant.*

ILLINOIS.

Temperature.—The mean was 4.1 above the normal of the last 15 years; maximum, 78, at Rushville, 5th; minimum, 18, at Sycamore, 26th.
Precipitation.—The average was 1.09 below the normal of the last 15 years; greatest monthly, 7.35, at Golconda; least monthly, 0.25, at Mattoon.
Wind.—Prevailing direction, northwest.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

INDIANA.

Temperature.—Maximum, 75, at Cannellton, 7th; minimum, 14, at Point Isabel, 28th; greatest monthly range, 52, at Vevay; least monthly range, 38, at Mount Vernon.
Precipitation.—Greatest monthly, 5.78, at Mount Vernon; least monthly, 1.10, at Shelbyville.
Wind.—Prevailing direction, southwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

IOWA WEATHER AND CROP SERVICE.

Temperature.—The mean was 5 above the normal; maximum, 78, at Blakeville, 5th; minimum, -2, at Stilson, 7th; greatest monthly range, 62, at Blakeville; least monthly range, 36, at Independence and Dubuque.
Precipitation.—Greatest monthly, 3.55, at Hampton; least monthly, 0.71, at Larrabee.
Wind.—Prevailing direction, northwest.—*J. R. Sage, Des Moines, director; G. M. Chappel, Sergeant, Signal Corps, assistant.*

KANSAS.

Temperature.—The mean was above the normal; maximum, 84, at Lincoln, 4th, and at Shields, 5th; minimum, 9, at Lakin, 10th; greatest monthly range, 71, at Lakin; least monthly range, 44, at Lawrence and Collyer.
Precipitation.—Greatest monthly, 4.42, at Sedan; least monthly, 0.02, at Wallace.
Wind.—Prevailing direction, north.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

KENTUCKY.

Temperature.—The mean was about 4 above the normal; maximum, 81, at Franklin, 9th; minimum, 19, at Harrodsburgh, 29th; greatest monthly range, 58, at Harrodsburgh; least monthly range, 44, at Central City.
Precipitation.—The average was about 1.00 above the normal; greatest monthly, 7.70, at Princeton; least monthly, 2.90, at Caddo.
Wind.—Prevailing direction, southwest.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

LOUISIANA.

Temperature.—Maximum, 88, at Cameron, 6th; minimum, 24, at Plaquemine, 4th; greatest monthly range, 60, at Cheneyville; least monthly range, 30, at Port Eads.
Precipitation.—Greatest monthly, 7.46, at Cheneyville; least monthly, 0.28, at Edgard.
Wind.—Prevailing direction, north.—*George E. Hunt, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

Temperature.—The mean was 1.8 above the normal of 15 years; maximum, 70, at Highland Station, 9th; minimum, 11, at Highland Station, North Marshall, and Ypsilanti, 28th; greatest monthly range, 59, at Highland Station; least monthly range, 27, at Atlantic.
Precipitation.—The average was 0.64 below the normal for 15 years; greatest monthly, 4.30, at Stanton; least monthly, 0.68, at Crystal Falls and Gladwin.
Wind.—Prevailing direction, southwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

Temperature.—The mean was about 6 above the normal; maximum, 69, at Montevideo, 20th; minimum, -7, at Pine River Dam and Pokegama Falls, 8th; greatest monthly range, 67, at Pine River Dam; least monthly range, 39, at Duluth.
Precipitation.—Greatest monthly, 1.24, at La Crosse, Wis.; least monthly, 0.17, at Crookston.
Wind.—Prevailing direction, northwest.—*John Healy, Corporal, Signal Corps, Minneapolis, in charge.*

MISSOURI.

Temperature.—Maximum, 80, at Fayette and Protem; minimum, 20, at Steelville.
Precipitation.—Greatest monthly, 6.08, at Cairo, Ill.; least monthly, 0.18, at Laddonia.—*Prof. Francis E. Nipher, Saint Louis, director.*

NEBRASKA.

Temperature.—Maximum, 79, at O'Neill; minimum, 1, at Valentine.
Precipitation.—The southeast part of the state had a little more than its average rainfall, ranging from 1.00 to 2.00; throughout the remainder of the state the precipitation was less than 1.00, and generally less than 0.50.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Sergeant, Signal Corps, assistant.*

NEVADA.

Temperature.—Maximum, 86, at El Dorado Canyon, 4th; minimum, 5, at Pioche, 9th and 12th; greatest monthly range, 71, at Tybo; least monthly range, 40, at El Dorado Canyon.
Precipitation.—Greatest monthly, 1.41, at El Dorado Canyon; least monthly, trace, at Hot Springs and Downeyville.
Wind.—Prevailing direction, northwest.—*Prof. Charles W. Friend, Carson City, director; D. C. Grunow, Corporal, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Temperature.—The mean was normal; maximum, 71, at Groton (b), 6th, and Taunton (d), 8th; minimum, 2, at Berlin Mills and Berlin Falls, 28th; greatest monthly range, 62, at Lake Cochituate and Taunton (d); least monthly range, 35, at Nantucket.
Precipitation.—The average was 2.59 below the normal; greatest monthly, 3.66, at West Milan; least monthly, 0.55, at Lake Konomoc.
Wind.—Prevailing direction, northwest.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. Warren Smith, Private, Signal Corps, assistant.*

NEW JERSEY.

Temperature.—The mean was 1.7 above the normal; maximum, 74, at Beverly, 8th; minimum, 11, at Freehold, 28th; greatest monthly range, 58, at Egg Harbor City, Atlantic City, and Freehold; least monthly range, 40, at Lambertville.
Precipitation.—The average was 2.60 below the normal; greatest monthly, 1.10, at Trenton; least monthly, 0.38, at Atlantic City.
Wind.—Prevailing direction, northwest.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

NEW YORK.

Temperature.—Maximum, 71, at Middleburgh, 6th, and New York City, 8th; minimum, 2, at Utica, 24th; greatest monthly range, 65, at Middleburgh; least monthly range, 37, at Fort Porter.
Precipitation.—Greatest monthly, 6.41, at Sand Bank; least monthly, 0.41, at Addison.
Wind.—Prevailing directions, northwest and southwest.—*Prof. E. A. Fuetes, Ithaca, director; R. M. Hardinge, Private, Signal Corps, assistant.*

NORTH CAROLINA.

It was the driest November on record.
Temperature.—The mean was 2.5 above the normal; maximum, 85, at Chapel Hill, 11th; minimum, 12, at Franklin, 28th; greatest monthly range, 67, at Franklin; least monthly range, 34, at Hatteras.
Precipitation.—The average was 3.75 below the normal; greatest monthly, 1.91, at Highlands; least monthly, 0.00, at Franklin.
Wind.—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Sergeant, Signal Corps, assistant.*

NORTH AND SOUTH DAKOTA.

Temperature.—The mean was 6.2 above the normal; maximum, 78, at Millbank, S. Dak., 20th; minimum, -6, at Woonsocket, S. Dak., 10th; greatest monthly range, 75, at Woonsocket, S. Dak.; least monthly range, 42, at De Smet, S. Dak.
Precipitation.—The average was about 0.26 below the normal; greatest monthly, 3.20, at Webster, S. Dak.; least monthly, 0.03, at Fort Buford, N. Dak.
Wind.—Prevailing direction, northwest.—*S. W. Glenn, Sergeant, Signal Corps, Huron, S. Dak., in charge.*

OHIO.

Temperature.—The mean was 2.9 above the normal, and the mean temperature was the highest since the opening of the bureau; maximum, 76, at Portsmouth, 17th; minimum, 17, at Wauseon, 28th.
Precipitation.—The average was 0.52 below the normal; monthly snowfall varied from trace, at Pomeroy, to 3.5, at Jefferson.—*Prof. B. F. Thomas, Columbus, director; C. M. Strong, Sergeant, Signal Corps, secretary and assistant.*

OREGON.

The characteristics of the month were the excess in temperature and deficiency in precipitation.
Temperature.—The mean was 2.0 above the normal; maximum, 75, at Grant's Pass and Lakeview, 2d; minimum, 7, at North Powder, 15th.
Precipitation.—The average was nearly 4.00 below the normal; greatest monthly, 1.87, at Astoria; least monthly, 0.00, at many stations.
Wind.—Prevailing direction, north.—*Hon. H. E. Hayes, Master State Grange, Oswego, director; B. S. Pague, Sergeant, Signal Corps, assistant.*

PENNSYLVANIA.

Temperature.—The mean was 2° above the normal; maximum, 78, at Uniontown, 7th; minimum, 10, at Wilkes Barre, 29th; greatest monthly range, 58, at Charlesville; least monthly range, 42, at Catawissa, Harrisburg, Selin's Grove, and Eagle's Mere.
Precipitation.—The average was 2.00 below the normal; greatest monthly, 4.29, at Columbus; least monthly, 0.78, at Blue Knob.
Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

TENNESSEE.

The mean temperature was the highest and the precipitation the least reported for November in the last 8 years.

Temperature.—Maximum, 81, at Springdale, 12th; minimum, 19, at Springdale, 28th; greatest monthly range, 62, at Springdale; least monthly range, 42, at Union City.

Precipitation.—Greatest monthly, 6.49, at Covington; least monthly, 0.00, at Parkeraville and Dare.

Wind.—Prevailing directions, north and west.—J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.

TEXAS.

Temperature.—Maximum, 90, at Gallinas, 8th; minimum, 14, at Coldwater, 10th; greatest monthly range, 63, at Coldwater; least monthly range, 29, at La Grange.

Precipitation.—Greatest monthly, 5.27, at Weatherford; least monthly, 0.00, at La Grange.—D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.

WISCONSIN.

Temperature.—The mean was over 3 above the normal; maximum, 70, at Hayward, 20th; minimum, 7, at Hayward, 8th, and at Red Wing, Minn., 10th; greatest monthly range, 63, at Hayward; least monthly range, 26, at Cadiz.

Precipitation.—The average was slightly below the normal; greatest monthly 2.98, at Delavan; least monthly, 0.88, at Saint Paul, Minn.

Wind.—Prevailing direction, northwest.—R. E. Kerkam, Milwaukee, Sergeant, Signal Corps, in charge.

NOTES AND EXTRACTS.

EVAPORATION.

[By Assistant Professor T. RUSSELL.]

In Table I are given depths of evaporation for the months, in inches, as measured by a pan evaporimeter and by a Piche evaporimeter, at Sweetwater Dam, San Diego Co., Cal. The results are communicated by John E. Boal, voluntary observer. The results with the Piche were derived by taking the quantity of water evaporating from a wetted paper surface as one and one-third of the evaporation from an equal water surface. The evaporation from the pan, as shown by the table, is 1.12 times the evaporation given by the Piche. It may be concluded from this that in the long run, in the course of a year, the Piche gives a good approximation to the actual evaporation taking place.

In Table II are given the depths of evaporation observed at a number of stations in 1889 and 1890 with Piche evaporimeters.

In Tables III and IV are given depths of evaporation measured by pans. These values have been courteously communicated by the Hon. J. W. Powell, director of the U. S. Geological Survey.

TABLE I.—Comparison (in inches) of evaporation from a pan and as measured with a Piche evaporimeter at Sweetwater Dam, San Diego Co., Cal.

Month.	1889.		1890.	
	Pan.	Piche.	Pan.	Piche.
January			1.01	2.49
February			1.80	2.91
March			3.28	4.40
May			5.50	3.92
July	8.22	4.02		
August	7.26	4.99	7.87	4.86
September	7.81	7.46	6.48	5.31
October	4.52	3.57	5.49	5.99
November	3.36	6.59		
December	0.95	1.59		
Sums	32.72	28.22	32.33	29.88
Ratios	1.16		1.08	

TABLE II.—Evaporation (in inches) measured by Piche evaporimeter.

Place.	1889.				1890.			
	June.	July.	August.	September.	June.	July.	August.	September.
Boston, Mass.	4.5	3.5	3.4	3.0	4.8	5.4	4.7	3.1
New York City	3.6	3.9	3.8	2.7	5.6	4.5	3.6	2.6
Washington City	3.6	3.9	3.4	3.1				
Buffalo, N. Y.	2.5	3.7	4.5	3.6	3.0	4.7	3.9	2.8
Cincinnati, Ohio	4.2	5.0		4.1				
Memphis, Tenn.	4.7	4.2	4.9	4.1	3.8	5.9	4.7	3.2
New Orleans, La.	8.2	8.7	8.9	9.4				
Chicago, Ill.	3.7	5.4	6.4	4.9				
Saint Louis, Mo.	3.6	4.4	5.0					
Keeler, Cal.	9.8	14.2	12.1	8.8				
Yuma, Ariz.	13.5	14.1	11.7	8.9	16.3	11.8		
El Paso, Tex.	19.0	16.3	17.5	11.9				
Dodge City, Kans.	5.1	6.2	7.1	5.2				
San Antonio, Tex.	3.0	3.3	4.1	2.9				
Omaha, Nebr.	7.1	6.6	6.9	6.2	7.0	9.4	7.0	5.9
Denver, Colo.	7.3	9.6	9.5	7.4	11.6	12.7	8.1	8.1
Saint Vincent, Minn.	9.8	5.8			3.3	4.5	4.1	
Helena, Mont.	9.0	10.5	11.3	8.4	6.0	9.9	8.7	
Boise City, Idaho	8.4	10.6		6.4				
Albuquerque, N. Mex.	9.7	9.8	9.4	7.5				

TABLE III.—Evaporation (in inches) measured with pan in 1889.

Place.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Bozeman, Mont.								3.4	4.6	4.3	1.9	
Great Falls, Mont.								2.7	1.0			
Springdale, Mont.								6.8	7.1			
Livingstone, Mont.									3.2	2.9		
Hogan, Mont.									6.1			
Fort Douglass (Salt Lake City), Utah.								10.5	5.7	4.9	1.0	
Nephi, Utah						3.9	5.0	4.6	2.9			
Cherry Creek, Colo.						8.1	7.9	8.6	6.2	4.2	2.6	
Canon City, Colo.								7.1		3.6		2.3
Lamar, Colo.									7.2			
Embudo, N. Mex.	3.0	2.9	3.6	4.9								
Fort Bliss (El Paso), Tex.					10.9	10.7	9.6	11.4	9.2	6.8	4.6	2.8
Tempe, Ariz.							13.8	14.1	11.0	6.4	4.4	
Blood's, Cal.								7.9				
Lake Eleanor, Cal.								7.2				
Tuolumne (Mendo's), Cal.									5.9			
Lake Tenango, Cal.									5.7			
Little Yosemite, Cal.									7.2			
Provo City, Utah										3.3		

TABLE IV.—Evaporation (in inches) measured with pan in 1890.

Place.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Bozeman, Mont.						2.6						
Fort Douglass (Salt Lake City), Utah.				3.7	4.1	5.1	7.4	6.5	4.6	2.1	1.2	
Canon City, Colo.			3.8	4.8	5.3	7.3	6.0					
Fort Bliss (El Paso), Tex.	2.0	2.0	7.0	7.3	10.8	7.3	9.6	7.6			3.7	
Tempe, Ariz.				5.8	5.5	5.6	6.6	11.5	5.8	5.2		
Florence, Ariz.			5.8	8.2	11.5	13.5						
Yuma, Ariz.	2.0	2.8				7.2	8.5	7.2	7.0			

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, November, 1890.

Stations.	Temperature. (Fahrenheit.)			Precip'n.		Stations.	Temperature. (Fahrenheit.)			Precip'n.	
	Max.	Min.	Mean.				Max.	Min.	Mean.		
Alabama.						Arizona—Cont'd.					
Bermuda *†	81	30	56.4			Benson	80	35	53.7	0.50	
Citronelle	85	32	53.6	1.40		Bisbee†	73	28	49.6	0.63	
Columbiana†	80	25	56.0	0.00		Calabasas				0.50	
Decatur (1)†				0.00		Casa Grande	68	48	68.1	2.00	
Decatur (2)†	78	23	53.8	0.18		Chino	64	24	43.3	0.70	
Double Springs†	68	28	46.7	1.10		Chiri Cahua M't's.				1.72	
Eufaula†	80	36	60.3	1.00		Cottonwood				3.80	
Evergreen†	81	28	59.0	0.05		Dragoon†				0.20	
Fort Deposit	81	30	59.6	0.03		Dragoon Summit	76	40	55.2	0.64	
Greensborough	80	32	59.1	0.91		Dos Cabezas†				0.42	
Livingston (1)†	81	29	56.2	0.67		Farley's Camp		36	56.6	2.55	
Livingston (2)†	80.9	27	57.60	0.02		Fort Apache	79	20	45.5	2.83	
Marion†	81	27	57.6	0.20		Fort Bowie	78	28	50.4	0.61	
Mt. Vernon B'ks.	85	23	59.8	0.47		Fort Grant	72	26	50.2	0.16	
Opelika†	78	29	57.6	0.09		Fort Huachuca	77	29	50.2	1.04	
Selma (2)†	83	30	52.2	0.00		Fort Lowell	98	24	58.0	0.83	
Tusculumbia (1)	74	29	53.7	0.58		Gila Bend (1)†	82	50	66.0	0.60	
Tusculumbia (2)	78	26	55.1	0.35		Gila Bend (2)	83	50	66.1	0.64	
Union Springs	78	39	62.5	0.60		Grand Central Mill				0.28	
Uniontown	81	31	59.4	1.79		Holbrook†	72	20	41.6	2.08	
Valley Head†	82	23	50.2	0.35		Lochiel†	74	30	48.0	1.11	
Alaska.						Maricopa	80	52	65.8	0.21	
Juneau	60	30	39.2	18.46		Mineral Park				0.11	
Killianoo	47	30	36.8	8.80		Mount Huachuca	74	27	49.3	1.37	
Arizona.						Natural Bridge†				3.50	
Antelope Valley				2.70		New River†	65	40	58.6	1.77	
Ariz. Canal Co. Dam.	93	39	62.4	1.65		Oro				0.53	

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Arizona—Cont'd.				Ins.	California—Cont'd.				Ins.
Pantano	80	48	64.0	0.00	Glen Ellen	80	31	53.2	0.00
Payson				3.80	Goshen	85	42	60.9	0.43
Red Rock				2.90	Grass Valley				0.00
San Carlos	91	26	54.8	2.12	Haywards	88	36	57.4	0.00
Show Low				1.85	Hollister	83	34	54.3	0.05
Signal	86	33	58.4	0.46	Hornbrook	72	22	43.7	0.00
Simmons				0.41	Imperial	80	30	51.7	0.00
Springerville				1.65	Iowa Hill	82	36	58.2	0.00
Strawberry				2.90	Julian	75	37	56.8	2.00
Teviston				0.00	Keeler	77	40	56.4	0.12
Texas Hill	90	42	59.6	0.10	Keene	75	34	52.9	0.10
Tip Top				2.90	Kingsburg	78	35	51.9	0.00
Tucson (1)	87	34	57.4	0.83	King City	89	28	55.0	0.12
Tucson (2)	75	40	58.0	0.77	Knight's Landing	72	38	51.6	0.00
Walnut Grove				2.45	La Grange	85	38	55.7	0.18
Walnut Ranch				0.41	Lathrop	85	35	56.5	0.00
Whipple Barracks	78	19	43.8	1.64	Laurel	89	35	57.0	0.02
Willcox	81	25	53.5	0.44	Lemoore	80	35	53.7	0.00
Wilcox				0.63	Livermore	80	38	56.8	0.00
Woodruff				1.70	Livingston	80	37	55.2	0.03
Yuma	83	52	62.3	0.12	Long Beach	93	38	61.9	0.00
Arkansas					Los Angeles	92	43	64.1	0.15
Arkansas City				2.80	Los Banos (2)	76	34	54.5	0.16
Brinkley	76	30	52.4	2.80	Los Gatos (1)	77	35	56.0	0.00
Camden	79	33	55.0	2.85	Los Gatos (2)	77	36	55.5	0.03
Conway	73	32	52.0	4.71	Mammoth Tank	94	52	68.3	0.00
Dardanelle				3.50	Martinez	72	35	51.7	0.00
Devall's Bluff	77	25	52.8	5.16	Milton (near)	78	43	58.2	0.00
Forrest City	79	32	59.6	6.54	Marysville	80	40	60.3	0.00
Fulton				3.37	Menlo Park	78	36	54.6	0.00
Harrisburgh	76	25	50.5	7.10	Modesto	81	32	55.3	0.00
Helena (1)				3.51	Mojave	84	36	53.4	0.15
Helena (2)	78	32	54.4	3.24	Monson	84	35	52.1	0.27
Hot Springs	71	31	50.3	5.00	Montague	74	38	50.4	0.00
Lead Hill	80	26	51.2	3.38	Monterey	78	34	54.6	1.32
Lonoke	78	34	57.8	4.19	Napa	78	32	50.8	0.00
Malvern	78	38	57.7	5.14	National City	98	43	64.9	0.93
Newport (1)				6.03	Newark	77	39	57.3	0.00
Newport (2)	75	30	52.0	5.85	Newhall	96	35	57.4	0.00
Oceola	76	29	53.2	5.06	Newman	80	38	55.5	0.00
Ozone	70	32	51.4	5.00	Niles	74	37	56.0	0.07
Pine Bluff	80	34	56.2	4.51	Norwalk	95	47	64.4	0.19
Prescott	76	36	55.6	4.09	Oakland (1)	83	39	57.2	0.00
Russellville	84	30	54.4	3.70	Oakland (2)	72	40	53.3	0.00
Stuttgart	79	30	53.7	5.15	Ogilby	99	56	72.4	0.02
Texarkana	81	32	57.8	3.78	Ontario	96	42	65.3	0.34
Winslow	73	32	51.9	4.22	Orland	97	40	61.1	0.00
California					Oroville	79	44	62.0	0.75
Alcade	82	40	57.2	0.00	Pajaro	82	35	55.9	0.37
Alcatraz Island	73	45	56.4	0.12	Paso Robles	86	27	50.0	0.30
Almaden	80	36	57.7	0.04	Petaluma	80	34	53.8	0.00
Anaheim	90	46	66.4	0.19	Placerville (1)	82	30	49.1	0.02
Angel Island	79	42	59.0	0.00	Placerville (2)	73	27	48.4	0.00
Antioch	83	40	58.8	0.00	Pleasanton	71	37	50.6	0.00
Aptos	80	35	55.0	0.28	Pomona	102	40	64.6	0.32
Athlone	85	37	55.6	0.24	Porterville	87	34	52.4	0.40
Auburn	84	38	57.3	0.00	Presidio of S. F.	77	40	57.8	0.00
Bakersfield	83	42	56.2	0.00	Puente	93	40	62.6	0.01
Barstow	82	32	53.2	0.05	Ravenna	86	36	58.4	0.27
Beaumont	84	40	57.1	0.43	Red Bluff	95	45	60.8	0.00
Belmont	80	38	54.8	0.00	Redding	92	37	58.1	0.00
Benicia Barracks	78	39	55.4	0.00	Riverside	95	36	57.7	0.33
Berendo	80	38	53.8	0.03	Rocklin	78	38	56.0	0.00
Berkeley	74	43	56.8	0.00	Rumsey	85	40	60.5	0.00
Borden	85	35	54.5	0.10	Sacramento (1)	88	28	44.9	0.00
Boulder Creek	84	28	47.9	0.25	Sacramento (2)	70	40	52.9	0.00
Brentwood	80	39	55.8	0.00	Salinas (1)	94	40h	52.8d	0.44
Brighton	85	36	57.2	0.00	Salinas (2)	60	40	50.8	0.59
Byron	80	34	55.2	0.00	Salton	95	37	62.7	0.00
Caliente	80	35	53.6	0.00	Sanger Junction	85	36	58.0	0.04
Calistoga	82	28	54.1	0.00	San Ardo	90	33	55.4	0.11
Campo				0.95	San Diego B'ks	88	43	62.8	0.75
Castroville	83	40	58.7	0.19	San Gabriel	95	42	62.4	0.23
Centerville	88	43	59.1	0.00	San Jose	70	38	55.1	0.05
Chico	82	40	57.2	0.00	San Mateo	68	38	55.6	0.00
Cisco	64	27	44.7	0.00	San Miguel	80	30	53.3	0.01
Colfax	82	36	56.2	0.00	San Pedro	95	46	66.2	0.12
Colton	92	38	61.9	0.19	Santa Ana	85	46	63.4	0.30
Corning	92	35	61.0	0.00	Santa Barbara (1)	90	40	63.3	0.48
Crescent City				0.08	Santa Barbara (2)	80	42	58.7	0.50
Davisville	82	32	59.6	0.00	Santa Clara	75	36	50.0	0.07
Delano	82	42	57.9	0.19	Santa Cruz (1)	87	39	57.0	0.00
Delta	86	33	55.5	0.00	Santa Cruz (2)	85	34	55.3	0.02
Downey	88	46	63.5	0.22	Santa Margarita	80	25	46.5	0.00
Dunnigan	78	36	54.8	0.00	Santa Maria	86	36	58.3	0.70
Dunsmuir	78	35	52.9	0.00	Santa Monica	82	40	59.0	0.36
Edgewood	67	24	43.7	0.00	Santa Paula	82	44	67.9	0.34
El Dorado	85	32	57.8	0.00	Selma	86	35	54.2	0.50
Elmira	90	40	56.0	0.00	Seven Palms	94	40	62.7	0.00
El Verano	79	32	53.6	0.00	Shingle Springs	82	35	55.9	0.00
Emigrant Gap	71	35	48.8	0.00	Sims	82	30	48.5	0.00
Esparto	80	36	56.7	0.43	Sisson	69	24	41.4	0.00
Evergreen				0.15	Soledad	86	32	54.6	0.27
Farmington	83	35	57.4	0.00	Sonoma	79	33	56.6	0.00
Fernando	93	39	61.5	0.18	Soquel	80	34	57.3	0.00
Florence	91	42	61.6	0.13	South Vallejo	68	40	54.7	0.47
Folsom	86	40	58.1	0.00	Spadra	68	38	60.4	0.25
Fort Gaston	70	25	44.6	0.13	Steeles	82	39	59.4	0.40
Fort Mason	73	44	55.9	0.04	Stockton (2)	78	45	63.9	0.00
Fresno	82	38	58.5	0.25	Summit	62	25	39.8	0.00
Fruto	85	40	58.5	0.00	Susanville	70	26	44.2	0.35
Galt	94	37	55.3	0.00	Tehachapi	75	22	47.8	0.00
Georgetown	77	32	50.0	0.00	Tehama	72	43	58.3	0.00
Gilroy	84	30	54.1	0.10	Templeton	87	29	51.8	0.27
Girard	76	30	58.5	0.03	Towles	72	34	51.0	0.00

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
California—Cont'd.					Connecticut—Cont'd.				
Tracy	67	34	46.3	0.00	Middletown	66	15	39.5	0.75
Traver	75	33	56.5	0.63	New Hartford (1)*	56	10	32.5	0.88
Tropico	98	38	63.1	0.00	North Woodstock				1.10
Tulare	98	41	57.9	0.33	Shelton	65	15	38.9	0.78
Turlock	78	35	54.0	0.03	Southington*	60	15	38.1	0.70
Upper Mattole	88	32	53.0	0.67	South Manchester				0.78
Vacaville (1)*	83	38	56.7	T.	Thompson	63	12	37.4	0.00
Vacaville (2)*	83	38	57.6	0.00	Uncasville				0.90
Valley Springs*	80	40	56.2	0.00	Voluntown*	68	13	40.3	1.04
Vina*	82	38	57.7	0.00	Wallingford				0.97
Volcano Springs*	97	35	64.1	0.00	Waterbury	63	14	37.4	0.95
Volta*	80	33	54.0	0.15	West Simsbury				0.61
Walla Walla Ck.	66	24	44.6	0.19	Delaware.				
Westley*	74	37	56.4	0.00	Dover	73	22	45.9	0.50
Wheatland	84	35	53.8	0.00	Kirkwood*	62	26	43.2	0.00
Whittier*	85	52	66.5	0.15	District of Columbia.				
Williams	65	35	48.6	0.00	Kendall Green	70	25	47.5	0.00
Willow (1)	82	34	55.4	T.	Washington B'ks	74	27	48.2	0.76
Willow (2)	96	32	56.6	0.00	Florida.				
Winters	86	38	57.6	0.00	Alva†	88	46	69.0	2.15
Woodland*	80	37	56.7	0.00	Eustis*	87	45	66.6	1.94
Colorado.					Fort Barrancas	87	43	66.5	0.66
Abbott†				0.15	Fort Meade*	85	41	68.8	3.38
Agate	78	30	45.8	0.00	Gainesville	84	40	66.8	1.47
Alford				0.29	Hypoluxo*		54	72.8	6.12
Alma†	52	-6	25.9	0.50	Madison†	80	42	63.7	1.06
Amherst†				0.60	Merritt's Island†	83	52	71.3	4.00
Apishapa†	80	39	56.0	0.10	St. Francis B'ks	81	44	65.9	1.90
Arona				0.20	San Antonio*	85	49	69.7	1.60
Beaver Creek				0.44	Tallahassee	82	36	61.2	2.65
Bennett*	82	12	32.0	0.70	Villa City†	88	48	64.9	0.82
Box Elder†				0.70	Georgia.				
Brandon				0.00	Albany	80	32	61.1	0.05
Breckenridge†	80	-20	30.8	1.50	Allapaha	82	35	60.2	1.70
Brush†				0.40	Americus	82	30	59.2	0.42
Burlington	72	8	32.8	0.11	Athens (1)	75	29	55.9	0.76
Byers	65	28	42.8	0.73	Athens (2)†	75	27	54.6	0.31
Canon City	75	15	45.9	0.70	Bainbridge	82	32	61.3	0.21
Chromola				0.30	Blakely	84	32	58.0	0.24
Climax*	48	-5	23.2	0.40	Camak	77	30	57.8	0.12
Como (near)†	53	-4	24.8	0.78	Cartersville	76	25	54.5	0.15
Cumbres*	53	-4	25.0	2.70	Columbus	76	35	55.8	0.16
Deer Trail	68	12	39.6	0.05	Diamond*		28	50.4	0.50
Delta†	68	13	37.0	0.15	Eastman	84	32	60.6	0.79
Dillon†				0.26	Forsyth*	85	36	61.7	0.50
Eagle Farm†				0.62	Fort Gaines	82	30	59.2	0.26
Elkhorn†				0.75	Fort McPherson	82	30	57.7	0.00
Emma				0.48	Gainesville	76	24	52.6	0.03
First View*	73	26	41.4	0.10	Gillsville	79	29	57.6	0.00
Fort Collins†	76	6	38.1	0.32	Griffin	78	30	57.4	0.00
Fort Collins (near)†				0.44	Heplzibah	76	40	62.8	1.08
Fort Lewis	67	9	36.6	1.39	Marietta†	77	24	53.4	0.21
Fort Logan	75	15	41.7	0.30	Milledgeville*†	81	31	57.8	T.
Fort Morgan†	75	3	30.0		Millen	84	28	58.9	0.81
Fruita†	70	10	35.1	0.22	Monticello*		36	55.0	0.20
Georgetown†	56	10	35.6	0.37	Newnan†	78	28	56.6	0.14
Hugo*	70	18	38.9		Perry*		40	56.5	0.85
Husted†	75	11	37.6	0.25	Point Peter*		28	53.4	
Julesburg	77	6	37.9	0.00	Poulan	85	30	58.4	0.44
Kirk†				0.23	Quitman (1)	82	38	61.4	1.40
Kit Carson*	68	38	51.2	0.00	Quitman (2)	84	34	62.9	2.27
Lamar†	80	11	44.6	0.05	Thomasville(2).	84	35	63.2	1.16
La Porte				0.35	Union Point	80	26	56.4	0.00
Las Animas†	79	11	40.8	0.00	Washington	76	30	56.7	1.55
Lay				0.45	Way Cross	84	36	68.6	0.30
Leadville†	54	3	26.8	0.11	Waynesborough	79	32	59.2	0.12
Le Roy†	72	13	36.2	0.48	West Point	76	38	59.2	0.00
Livermore				0.26	Wooley's Ford	74	30	51.7	
Monte Vista†	61	3	30.2	0.00	Idaho.				
Morraine†	59	4	36.6	0.05	American Falls†	65	4	31.6	0.00
Pagoda (near)	63	3	32.4	0.55	Boise Barracks	63	17	37.7	0.00
Pagosa Springs*	66	8	30.8	0.38	Era†	61	7	33.8	0.00
Parachute†				0.96	Fort Sherman	70	25	42.6	0.53
Peyton				T.	Henry's Lake	62	1	29.2	0.62
Red Cliff†				0.27	Mullan†	67	19	33.9	1.96
River Bend	88	20	42.2	0.00	Payette†	68	10	36.8	0.00
Rocky Ford†	80	13	40.9	0.30	Illinois.				
Saint Cloud†				0.38	Aurora (1)†	66	19	38.4	1.79
Sanborn				0.65	Aurora (2)	69	23	40.4	2.08
San Luis	67	8	37.4	0.70	Beardstown†				1.63
San Luis Ex.Sta.	63	2	33.4	0.55	Beason	68	24	41.5	1.10
Sedgewick†				0.13	Belvidere	64	20	38.5	1.91
Smoky Hill Mine				0.70	Centralia	70	24	45.5	2.43
Stamford†				2.12	Charleston	72	25	45.6	1.93
T. S. Ranch†	70	15	39.4	0.30	Collinsville	70	30	47.0	1.92
Thont	78	12	40.2	0.03	Cockrell	62	20	39.7	1.96
Vilas				0.00	East Peoria	74	27	47.2	2.14
Villa Grove†				0.20	Fort Sheridan	64	23	42.0	0.92
Watervale†				T.	Goconda*†	72	30	49.8	7.35
Watkins	62	18	31.3	0.22	Grand Tower†				4.23
Westcliffe	64	-12	30.9	0.62	Greenville	75	25	45.9	2.06
Wray†				0.25	Griggsville*	75	25	41.8	1.40
Yuma†				0.50	Hennepin	70	20	39.7	1.45
Connecticut.					Irishtown				2.39
Birmingham				0.82	Jordan's Grove	71	26	46.1	2.38
Canton	64	12	39.8	0.70	Lacon*	70	22	41.3	1.87
Colchester	61	14	40.1		Laonar	68	22	36.7	1.17
Falls Village				1.00	Louisville	70	24	44.0	2.20
Fort Trumbull	68	17	44.7	0.82	Martinsville		25	43.7	2.25
Hartford (1)	64	15	39.8	0.71	Mascotah	76	23	48.8	2.60
Hartford (2)				0.65	Mattoon	77	27	48.0	0.25
Lake Konomoc				0.55	Mount Carmel†				5.26
Lebanon				0.94	Olney (1)*	72	29	48.1	2.05
Mansfield	64	13	37.9	0.82	Olney (2)	70	27	45.8	3.40
Meriden		11		3.06	Oswego*	65	22	39.2	1.61

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Illinois—Cont'd.</i>					<i>Kansas—Cont'd.</i>				
Ottawa?	70	23	42.6	3.06	Alton	73	13	42.2	1.07
Palestine	74	23	45.9	3.74	Altoona	73	13	42.2	3.45
Pana	72	23	47.2	3.30	Bucklin	73	20	46.0	0.40
Peoria (1)?	72	23	47.2	1.95	Buffalo	73	20	46.0	0.35
Peoria (2)	74	26	44.2	1.79	Burr Oak	73	20	46.0	0.75
Philo	69	19	42.8	3.36	Cawker City	72	22	41.8	0.80
Pontiac	72	20	42.6	1.45	Coldwater	72	22	41.8	0.50
Riley	62	20	38.4	1.74	Collyer	72	28	41.0	1.30
Rockford	59	21	39.0	3.23	Columbus	72	28	41.0	2.07
Rock Island Arsl.	70	22	42.3	1.71	Concordia	72	16	40.4	0.38
Rushville	78	26	42.1	2.06	Cunningham	78	17	42.1	0.40
Sandwich	70	22	41.0	1.75	Downs	72	28	41.0	0.81
South Evanston	67	24	41.0	1.70	Elco	73	23	45.3	1.35
Sycamore	63	18	38.1	1.87	Elk Falls	80	28	54.6	3.00
Warren	38	26	43.4	1.85	Ellis (2)	76	20	43.7	1.50
Warsaw	68	23	42.5	1.85	Emporia	70	25	45.0	2.30
Waukegan	68	23	42.5	1.85	Englewood	77	22	45.5	0.28
White Hall	72	26	47.4	0.94	Eureka Ranch	80	18	43.1	1.99
Winnebago	68	20	39.2	2.10	Ft. Leavenworth (1)	74 ^m	23	46.1	1.99
<i>Indiana.</i>					Ft. Leavenworth (2)	69	23	43.6	2.10
Angola	66	23	42.4	2.88	Fort Riley	72	23	45.3	1.05
Butler	70	28	46.0	4.26	Fremont	77	15	42.2	1.00
Cannelton	73	28	46.0	5.75	Globe	68	23	40.0	2.71
Columbia City	65	20	41.7	2.38	Gove City	88	23	41.9	0.83
Columbus	72	26	44.4	2.41	Grainfield	72	25	42.2	1.10
Connersville	67	24	45.5	3.86	Grenola	76	27	45.4	3.30
Crandall	71	25	44.0	5.45	Grinnell	76	26	45.8	0.25
De Gonia Springs	72	28	48.8	5.04	Halstead	68	19	43.3	0.94
Delphi	63	19	40.8	2.20	Havensville	70	16	38.4	1.50
Farmland	68	20	45.7	3.98	Horton	68	21	43.6	1.49
Franklin	71	24	44.7	3.98	Hoxie	74	29	46.0	0.56
Huntingburg	71	24	48.8	5.72	Independence	70	26	47.5	3.82
Huntington	71	24	48.8	5.72	Junction City	70	26	47.5	3.82
Jeffersonville	71	27	48.0	4.89	Kansas City	75	24	44.4	2.86
La Fayette	67	21	44.6	3.22	Kellogg	70	21	46.5	2.70
Logansport (1)	66	24	42.9	1.44	Kirwin	70	21	46.5	2.70
Logansport (2)	66	24	42.9	1.44	La Crosse	74	24	42.3	0.81
Mauy	67	19	40.2	3.07	La Harpe	70	28	42.5	2.87
Mount Vernon (1)?	68	30	49.6	5.78	Lakin	80	9	40.4	0.50
Mount Vernon (2)	68	30	49.6	5.78	Lawrence	68	24	44.1	2.56
Muncie	66	27	46.4	2.88	Lebo	75	21	45.1	3.47
Point Isabel	63	14	38.2	2.73	Lincoln	84	22	40.4	0.65
Princeton	72	28	43.3	5.53	Mackaville	74	15	43.5	0.35
Richmond	66	22	43.7	2.72	Manhattan (1)?	70	16	41.9	0.91
Rockville	72	24	46.6	3.32	Manhattan (2)?	73	18	41.4	1.03
Rushville	72	24	46.6	3.32	Manhattan (3)?	73	18	41.4	1.03
Shelbyville	70	25	46.5	3.39	Marmaton	72	22	45.5	3.37
Seymour	71	28	46.0	1.10	McAllister	72	22	45.5	3.37
Terre Haute	68	27	47.0	3.15	McPherson	72	22	45.5	3.37
Vandalia	67	27	41.6	1.37	Minneapolis	74	30	41.0	0.80
Vevay	72	20	48.0	2.92	Monument	74	22	41.0	0.90
Vincennes	72	20	48.0	2.92	Morse	75	22	45.5	3.18
Winnington	70	24	43.6	3.83	Norton	73	17	41.4	1.06
<i>Indian Territory.</i>					Oakley	74	21	41.0	0.20
Eufaula	83	20	48.5	1.53	Oberlin	74	21	41.0	0.20
Fort Supply	83	20	48.5	1.53	Ogallah	73	25	45.0	0.10
Headton	84	35	52.6	3.78	Oswego	77	29	49.6	3.65
Tulsa	84	35	52.6	3.78	Pago City	74	20	42.0	0.58
<i>Iowa.</i>					Plainville	70	18	41.5	1.50
Alta (1)?	61	13	36.7	1.14	Quenemo	74	22	43.0	3.25
Amana?	60	20	39.0	1.89	Quinter	72	24	44.0	0.40
Atlantic	69	17	37.0	1.17	Rome	72	24	44.0	0.40
Bancroft	60	9	34.4	1.10	Salina	67	25	42.9	0.70
Belle Plaine	60	16	37.5	1.93	Sedan	78	28	48.3	4.42
Blakesville	78	16	39.9	1.59	Seneca	76	18	41.7	1.29
Carroll	65	10	38.0	1.22	Sharon Springs	72	22	41.2	1.10
Carson	66	19	40.6	1.12	Shields	84	22	47.8	1.10
Cedar Falls	59	19	40.2	1.19	Tribune	74	23	41.2	0.40
Cedar Rapids	60	19	39.4	1.87	Wakarusa	72	23	44.7	1.07
Clairinda	67	23	40.0	1.39	Wa Keeney	72	22	42.9	0.23
Clinton	66	19	38.4	1.45	Wallace (1)	74	24	42.9	0.23
Cresco	59	8	33.6	1.59	Wallace (2)	74	24	42.9	0.23
Eagle Grove	63	10	36.5	1.00	Wellington	73	23	45.2	3.14
Fayette	60	10	35.9	1.49	Weskan	79	24	45.2	0.05
Fort Madison	68	23	42.4	1.84	Winona	70	20	41.0	4.37
Greenwood (1)	72	18	42.9	1.30	Yates Centre	70	20	41.0	4.37
Greenwood (2)	64	18	38.0	1.54	<i>Kentucky.</i>				
Grinnell	59	11	34.8	3.55	Bowling Green	73	25	45.0	3.58
Hampton	60	11	34.8	3.55	Burnside	76	30	46.7	2.90
Humboldt	60	12	35.6	0.74	Caddo	76	30	46.7	2.90
Independence	56	30	37.9	1.30	Cattletown	75	26	48.6	5.80
Indianola	64	19	40.8	1.36	Canton	72	26	48.6	5.80
Iowa City	65	25	44.8	0.71	Central City	72	26	48.6	5.80
Larabee	65	25	44.8	0.71	Earlington	77	30	55.2	0.40
Le Claire	65	25	44.8	0.71	Eddyville	77	30	55.2	0.40
Logan	68	18	41.9	1.32	Edmonton	75	23	47.3	4.57
Manson	54	13	33.6	1.99	Falmouth (1)?	74	20	45.9	5.18
Maquoketa	63	21	38.1	1.33	Frankfort (1)?	74	20	45.9	5.18
McCausland	60	21	38.1	1.33	Frankfort (2)?	81	27	52.3	4.05
Monticello	63	18	37.5	1.75	Franklin	74	20	45.9	5.18
Mount Pleasant	64	22	40.1	1.65	Greensburg	77	19	47.5	4.00
Mount Vernon	60	22	40.1	1.65	Harrodsburg	77	19	47.5	4.00
Osage	48	11	32.4	1.50	Harrodsburg	77	19	47.5	4.00
Oskaloosa (1)?	66	27	41.8	1.27	Mount Sterling	79	23	47.5	4.99
Panama	54	15	40.6	1.30	Newport Barracks	74	23	47.3	2.87
Pao City	54	9	33.8	0.50	Paducah	74	23	47.3	2.87
Shiloh	58	16	35.1	1.00	Pellville	74	23	48.5	5.83
Storm Lake	58	16	35.9	1.05	Princeton	74	24	48.5	7.70
Vinton	60	15	37.7	1.74	Richmond	77	23	48.5	3.01
Washington	70	24	41.9	1.52	Shelbyville	72	23	46.0	5.14
Webster City	62	10	33.8	1.25	Williamsburg	72	23	46.0	5.14
West Bend	64	11	34.7	1.46	<i>Louisiana.</i>				
<i>Kansas.</i>					Alexandria	84	28	59.0	4.80
Abilene	70	18	42.9	1.20	Amite City	84	29	60.8	2.67
Allison	73	17	36.5	1.35	Baton Rouge	84	31	61.4	0.68

Meteorological record of voluntary observers, &c.—Continued.

Stations.		Temperature. (Fahrenheit.)			Precip'n.	Stations.		Temperature. (Fahrenheit.)			Precip'n.
		Max.	Min.	Mean				Max.	Min.	Mean	
Louisiana—Cont'd.					Ins.	Massachusetts—Con.					Ins.
Cameron?	88	35	63.7	4.76		Mount Nonotuck	61	17	42.1	1.25	
Cheneyville	86	26	58.8	8.16		Mystic Lake	64	14	40.8	1.36	
Clinton d.	81	40	62.3	0.50		Mystic Station	61	17	42.1	1.25	
Coushatta (1) f.	82	30	58.6	1.48		Nahant	61	17	42.1	1.25	
Coushatta (2)	82	30	58.6	1.38		New Bedford (1)	64	14	40.8	1.31	
Crowley	83	34	63.8	1.84		New Bedford (3)	66	15	41.3	1.30	
Davis	78	28	57.0	3.34		Newburyport (1)	63	15	39.0	1.52	
Delhi f.	84	38	63.4	0.28		Newburyport (2)	63	15	39.0	1.52	
Edgard	84	38	63.4	0.28		Northampton	56	15	37.4	1.42	
Emilie	83	35	61.6	0.47		North Billerica	63	13	39.3	0.80	
Farmerville	79	35	56.6	4.34		Plymouth	66	18	42.4	0.69	
Grand Coteau	82	33	60.8	1.51		Princeton	60	8	.....	1.48	
Homer	77	36	57.6	3.47		Randolph	.....	.....	1.10		
Jackson Barracks	85	35	62.7	0.40		Roberts' Dam	.....	.....	1.28		
Jeanerette	85	32	64.3	2.13		Royalston *	600	160	40.4	3.50	
La Fayette f.	84	31	62.4	1.61		Salem (2)	.....	.....	1.51		
Lake Charles	82	30	60.3	7.20		Somerset *	72	14	42.5	1.04	
Liberty Hill	81	29	58.0	3.12		South Hingham	.....	.....	1.50		
Mandeville	82	32	61.2	1.08		Springfield Arm'y.	62	14	38.6	1.11	
Marksville	80	36	60.6	1.08		Taunton (1) f.	69	15	41.0	0.93	
Maurepas	81	32	61.2	0.95		Taunton (2)	69	14	40.6	0.91	
Melville f.	85	30	61.2	0.87		Taunton (3)	70	10	39.8	0.99	
Minden	80	32	57.2	3.05		Wakefield	61	12	.....	1.53	
Monroe f.	81	35	57.4	4.76		Wellesley	65	18	40.4	.....
Natchitoches	81	28	58.3	3.15		Westborough *	65	12	39.6	1.07	
New Iberia	84	34	64.4	0.74		Winchester *	61	14	37.7	1.41	
Paincourtville	84	32	62.1	0.49		Worcester (1) *.	61	14	37.7	1.73	
Plaquemine	83	24	60.6	0.60		Michigan					
Shell Beach	79	38	.....	2.81		Adrian	68	17	40.9	3.75	
Sugar Ex. Station	82	39	62.0	0.87		Albion (1)	62	22	40.5	2.64	
Thibodeaux	82	.....	.....	0.40		Allegan	66	21	40.5	2.41	
West End	.....	.....	.....	0.77		Alma	63	23	38.9	2.55	
Winniborough	86	45	66.0	1.09		Ann Arbor	64	18	39.7	3.15	
Maine.						Arbela f.	.....	.....	2.11		
Bar Harbor	56	14	37.6	2.59		Atlantic *	42	17	31.2	1.30	
Belfast *	56	18	35.1	.....		Ball Mountain	62	16	37.6	2.04	
Calais	61	10	36.2	2.27		Bangor	63	28	40.7	2.61	
Cornish	56	6	34.6	2.66		Bear Lake	52	22	36.2	2.68	
Fairfield	55	10	34.0	2.05		Bellaire	54	20	35.8	2.49	
Farmington *	.....	11	30.5	2.39		Bell Branch	60	17	39.6	2.48	
Fort Preble	61	13	38.5	2.30		Benton Harbor	66	25	44.5	2.51	
Kennebec Arsenal	58	10	31.8	1.97		Berlin	63	19	38.1	2.68	
Kent's Hill	54	9	32.3	2.26		Berrien Springs (1)	65	26	42.6	3.17	
Lewiston	55	10	32.9	1.89		Birch Run	.....	.....	0.90		
Mayfield	50	6	27.3	2.01		Birmingham	65	12	39.7	3.17	
Orono f.	55	12	34.7	2.67		Bronson	52	18	35.4	2.91	
Petit Menan *	55	19	38.4	.....		Calumet	45	17	32.2	1.24	
West Jonesport	52	18	35.2	.....		Cassopolis	64	25	41.9	2.12	
Maryland.						Caldwell	57	20	34.0	.....
Barren Creek Sp'gal	74	30	47.2	0.90		Charlevoix	55	21	37.3	1.70	
Cumberland (1)	66	22	44.3	1.83		Chase	58	20	36.3	.....
Cumberland (2)	72	24	47.8	1.42		Chesobyan	50	20	32.8	2.27	
Fallston	71	31	44.5	0.87		Clinton	66	13	40.3	2.28	
Fort McHenry	70	34	46.1	0.77		Colon	58	24	37.4	2.02	
Frederick	71	34	47.4	0.76		Concord	61	17	38.5	1.95	
Gaithersburgh *	.....	23	42.7	.....		Crystal Falls	50	13	30.6	.....
McDonogh	70	24	45.9	2.82		Eden	65	17	39.1	3.44	
Mt. St. Mary's Col.	69	15	42.5	0.98		Evart	60	17	35.0	2.36	
Woodstock	69	19	44.6	0.86		Fairview	65	19	39.1	2.12	
Massachusetts.						Fitchburgh	68	13	39.1	3.26	
Amherst	58	11	37.6	1.34		Fort Brady	52	4	32.4	0.73	
Amherst ExSta (1)	60	13	36.2	1.34		Fort Mackinac	48	21	34.2	1.22	
Amherst ExSta (2)	57	10	37.2	1.32		Fort Wayne	65	13	40.8	1.33	
Andover	70	11	37.1	1.50		Fremont *	57	23	38.1	1.25	
Blue Hill (sum't).	63	11	38.2	1.11		Gaylord	50	19	33.5	1.65	
Blue Hill (base)	66	12	39.4	1.14		Gladwin	63	20	38.0	0.68	
Blue Hill (valley)	67	12	39.5	1.11		Grand Rapids	59	23	39.8	1.46	
Boston	.....	.....	.....	1.11		Grape	65	18	41.6	2.22	
Brewster	65	20	42.8	1.19		Grayling	56	18	35.2	1.90	
Cambridge (1)	62	11	40.0	1.15		Gulliver Lake	50	19	33.7	1.44	
Cambridge (2)	62	15	39.2	1.28		Hanover	64	19	42.6	2.50	
Chestnut Hill	65	14	40.4	1.37		Harrison	52	16	34.0	1.23	
Chicopee	.....	.....	.....	1.72		Harrisville	58	22	35.7	1.63	
Clinton	.....	.....	.....	1.05		Hart	60	25	41.1	1.45	
Concord	62	13	37.9	1.30		Hastings	61	28	39.9	2.48	
Cotuit	62	16	41.1	1.45		Hayes	62	26	39.5	2.02	
Deerfield	60	11	36.2	.....		Highland Station *	70	11	37.3	3.05	
Dudley *	64	10	39.2	0.88		Hilldale	63	18	39.3	2.79	
Fall River (1) *	63	15	42.3	1.39		Holt	.....	.....	2.83		
Fiskdale	.....	.....	.....	0.90		Howell	61	14	39.7	3.55	
Fitchburg (1)	58	14	36.5	1.63		Hudson	68	12	37.5	2.77	
Fitchburg (2)	53	12	36.7	1.68		Ionia	69	18	41.6	2.49	
Fort Warren	59	15	39.6	1.07		Ivan	54	20	35.1	2.19	
Framingham	65	13	39.8	1.25		Jackson	63	18	40.3	.....
Gilbertville	60	10	37.2	1.68		Jeddo	60	25	39.5	2.61	
Groton (1)	61	12	37.9	1.57		Kalamazoo	64	20	43.4	2.54	
Groton (2)	71	.....	.....	.....		Lansing	62	20	39.0	2.91	
Heath	52	8	33.2	.....		Lathrop	50	14	32.2	0.96	
Kendall Green	64	12	40.1	1.35		Madison	65	18	40.6	2.23	
Lake Cochituate	67	5	38.9	1.24		Marshall	63	19	40.0	2.70	
Lawrence	60	12	37.4	1.63		May	61	24	39.1	2.13	
Leicester	60	10	35.8	1.22		Mio	59	22	35.4	1.75	
Leominster	.....	.....	.....	1.56		Montpelier	53	27	38.4	1.60	
Long Plain *	68	12	46.2	1.52		Mottville	65	18	41.0	1.97	
Lowell (1)	62	13	38.1	1.59		Noble	.....	.....	2.10		
Lowell (2)	62	10	37.4	.....		North Andover	.....	.....	2.98		
Lowell (3)	67	14	38.9	.....		North Marshall	69	11	37.4	2.84	
Ludlow (1)	60	6	35.8	1.51		Northport	51	20	36.6	1.67	
Ludlow (2)	66	9	38.6	1.10		Olivet	61	18	38.4	2.38	
Lynn	61	13	36.7	1.48		Osago	64	20	39.4	3.16	
Manafield	66	13	38.9	0.95		Ovid	60	26	38.2	2.20	
Medford	.....	.....	.....	1.36		Parkville	.....	.....	2.36		
Middleborough	69	8	39.4	1.11		Paw Paw	65	20	40.3	1.87	
Milton *	65	16	39.9	1.24		Pontiac	62	23	40.9	3.02	
Monson	65	8	36.3	0.89		Pulaski *	60	20	39.5	2.10	

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Michigan—Cont'd.	0	0	0	Ins.	Missouri—Cont'd.	0	0	0	Ins.
Rawsonville.....	68	14	43.4	2.85	Glenwood.....	74	24	42.6	1.54
Romeo.....	63	20	37.9	2.86	Gordonville.....	74	26	49.6	1.60
Saint Ignace.....	65	20	33.3	2.05	Grand Pass.....	76	24	44.6	2.48
Saint John's.....	63	24	39.4	1.83	Hannibal.....	74	26	44.6	1.80
Sand Beach.....	64	23	37.6	2.54	Harrisonville.....	70	22	43.3	3.46
Standish.....	50	12	33.0	2.12	Hermann.....	70	28	41.8	1.12
Stanton.....	63	20	37.1	4.30	Jefferson Barracks.....	78	25	48.7	2.10
Stockbridge.....	60	23	39.5	2.58	Jefferson City.....	77	28	47.8	1.81
Thornville.....	65	23	39.5	2.70	Jerome.....	77	28	47.8	1.81
Vandalia.....	62	24	41.4	2.16	Kansas City.....	78	24	45.4	2.78
Vienna.....	62	24	41.4	2.16	Kidder.....	78	24	45.4	2.78
Washington.....	63	19	39.8	2.47	Ladonia.....	80	28	45.7	1.48
Weldon Creek.....	57	25	37.0	1.57	Lamonte.....	80	28	45.7	1.48
West Branch.....	59	21	35.4	2.11	Lebanon.....	76	30	51.4	2.28
White Pigeon.....	62	26	42.6	2.93	Liberty.....	74	31	43.2	2.55
Williamston.....	62	26	42.6	2.93	Louisiana Bridge.....	76	25	44.0	2.97
Ypsilanti (1).....	63	11	36.9	2.68	Marshall (1).....	76	25	44.0	2.97
Ypsilanti (2).....	65	16	37.4	2.38	Marshall (2).....	78	33	44.0	2.97
Minnesota.					Marshallfield.....	76	33	44.0	2.97
Alexandria.....	60	4	30.8	0.81	Mexico.....	86	26	44.8	1.60
Crookston.....	60	4	30.8	0.81	New Haven.....	76	24	44.8	1.60
Farmington.....	66	3	35.0	0.59	Oak Ridge.....	76	24	44.8	1.60
Fergus Falls.....	54	8	34.7	0.50	Oregon.....	73	21	43.6	4.05
Fort Ripley.....	61	7	32.6	0.82	Pickering.....	73	21	43.6	4.05
Fort Snelling.....	61	7	32.6	0.82	Platte River.....	64	20	43.8	1.86
Grand Meadow.....	60	6	31.4	0.34	Princeton.....	70	23	43.6	1.50
L. Winnibigoshish.....	56	5	30.0	0.40	Saint Charles (1).....	79	25	47.4	1.56
Leech Lake.....	59	4	29.4	0.41	Saint Charles (2).....	79	25	47.4	1.56
Le Sueur.....	59	3	29.4	0.41	Saint Joseph.....	79	25	47.4	1.56
Mankato.....	62	9	36.8	0.52	Sarcoxie.....	76	26	46.6	2.80
Medford.....	62	9	36.8	0.52	Sedalia.....	78	24	46.3	1.89
Minneapolis.....	55	8	34.0	0.39	Shelbina.....	72	20	45.4	0.83
Montevideo.....	69	4	34.6	0.43	Stellada.....	72	20	45.4	0.83
Morris.....	59	3	31.8	0.50	Warrensburg.....	74	26	49.2	2.92
Northfield.....	60	2	34.2	0.60	Warrenton.....	74	26	49.2	2.92
Ortonville.....	60	2	34.2	0.60	Willow Springs.....	75	26	50.4	4.40
Pine River.....	60	2	34.2	0.60	Windsor.....	71	21	46.8	1.80
Pokeyama Falls.....	59	7	29.3	0.34	Wither's Mills.....	78	26	47.1	1.90
Red Wing.....	59	7	29.3	0.34	Montana.				
Redwood Falls.....	59	7	29.3	0.34	Blackfoot Agency.....	67	4	40.0	0.35
Rolling Green.....	56	6	33.3	0.30	Camp Poplar River.....	65	8	35.3	0.13
Saint Charles.....	62	8	35.2	1.00	Choteau.....	72	4	42.8	0.50
Sheldon.....	62	8	35.2	1.00	Custer.....	68	9	40.6	0.20
Thay.....	62	8	35.2	1.00	Fort Assiniboine.....	68	9	40.6	0.20
Mississippi.					Fort Custer.....	74	10	39.9	1.61
Aberdeen.....	78	24	52.9	0.00	Fort Keogh.....	72	8	35.9	0.37
Agricultural College.....	79	29	58.3	0.01	Fort Missoula.....	60	10	33.1	0.60
Batesville.....	79	29	58.3	0.01	Fort Shaw.....	72	8	41.7	0.61
Bay Saint Louis.....	78	43	64.6	1.00	Glendive.....	68	14	38.8	0.29
Booneville.....	75	35	59.1	3.18	Powder River.....	69	5	36.4	0.30
Brookhaven.....	85	27	60.4	1.95	Virginia City.....	59	4	35.0	0.06
Canton.....	79	32	57.9	0.31	Nebraska.				
Columbus (1).....	80	28	56.8	0.00	Alliance.....	74	4	35.5	0.45
Columbus (2).....	80	28	56.8	0.00	Ansley.....	79	6	38.6	0.70
Corinth.....	80	28	56.8	0.00	Ashland.....	68	18	40.2	1.43
Edwards.....	83	31	59.4	0.60	Bassett.....	72	12	34.5	0.85
Enterprise.....	80	29	57.4	0.35	Burwell.....	69	8	35.2	0.33
Fayette.....	80	29	57.4	0.35	Crawford.....	55	4	37.6	0.33
Greenville.....	80	37	57.9	1.48	Creighton.....	66	7	34.8	0.93
Hazlehurst.....	83	35	62.8	1.45	Crete.....	71	16	40.2	1.42
Hernando.....	74	32	55.2	0.98	Culbertson (1).....	71	16	40.2	1.42
Holly Springs (1).....	78	34	57.5	3.54	Culbertson (2).....	71	16	40.2	1.42
Holly Springs (2).....	76	30	54.4	4.12	De Soto.....	67	19	39.4	1.11
Jackson.....	82	32	59.2	1.00	Dunning.....	67	19	39.4	1.11
Kosciusko.....	82	29	58.0	0.60	Ericson.....	76	9	38.5	0.35
Lake.....	72	24	50.6	1.33	Fairbury.....	74	8	35.2	0.50
Logtown.....	84	32	61.6	4.32	Fort Niobrara.....	74	8	35.2	0.50
Louisville.....	80	25	57.8	1.00	Fort Omaha.....	72	19	41.6	1.15
Macon (2).....	83	35	58.6	0.35	Fort Robinson.....	72	19	41.6	1.15
Moss Point.....	79	30	62.4	0.00	Fort Sidney.....	73	10	39.3	0.13
Natches (1).....	85	30	60.3	0.70	Franklin.....	72	14	40.2	0.72
Natches (2).....	85	30	60.3	0.70	Fremont.....	69	18	40.2	0.76
Okolona.....	79	26	56.4	0.50	Geneva.....	70	11	38.4	1.07
Pearlington.....	83	42	61.7	4.34	Gering.....	73	16	40.2	0.56
Port Gibson.....	86	36	58.2	1.75	Grand Island.....	70	10	37.5	1.05
Pontotoc.....	78	29	53.8	2.80	Grant.....	70	12	37.5	1.05
Rienai.....	79	31	56.4	2.08	Hastings.....	70	12	37.5	1.05
Vaiden.....	88	36	66.6	1.33	Hay Springs.....	70	12	37.5	1.05
Washington.....	83	31	59.2	0.77	Hebron.....	66	19	40.8	0.45
Water Valley.....	81	30	57.6	2.28	Holdrege.....	72	22	43.0	0.85
Waynesboro (1).....	80	30	56.9	1.40	Imperial.....	68	18	41.4	0.20
Waynesboro (2).....	89	30	58.9	1.19	Kennedy.....	70	10	38.2	0.20
West Point.....	80	30	58.3	1.00	Kimball.....	73	9	38.2	0.35
Yasoo City.....	80	30	58.3	1.00	Lexington.....	78	8	40.0	1.14
Missouri.					Lincoln.....	69	17	41.7	0.61
Adrian.....	78	14	41.8	3.03	Marquette (1).....	70	14	41.7	0.61
Appleton City.....	77	24	45.7	2.25	Minden.....	73	10	37.8	1.30
Austin.....	79	26	46.8	4.70	Nebraska City.....	67	18	41.7	1.39
Boonville.....	73	20	43.4	3.90	North Loup.....	70	7	39.1	0.37
Brunswick.....	75	27	44.0	3.06	Oakdale.....	71	8	37.3	0.85
Carrollton.....	77	29	46.8	1.99	O'Neill.....	79	12	40.9	0.35
Carthage.....	77	29	46.8	1.99	Palmer.....	70	6	36.6	0.80
Cassville.....	75	23	45.3	2.84	Ravenna.....	72	10	39.3	1.03
Centerville.....	68	16	35.8	3.58	Sargent.....	72	24	41.2	1.40
Conception.....	68	16	35.8	3.58	Seward.....	68	24	41.2	1.40
Concordia.....	74	31	51.4	2.11	Superior.....	68	24	41.2	1.40
Dadeville.....	75	31	51.4	2.11	Syracuse.....	67	20	41.7	1.23
Eldon.....	80	28	48.6	1.23	Tecumseh.....	65	13	41.0	1.25
Excelsior Springs.....	72	20	40.2	2.95	Tekamah.....	71	13	40.7	1.35
Fayette.....	80	22	44.8	1.83	Wallace.....	73	12	38.9	0.20
Fortescue.....	72	22	44.2	1.13	Weeping Water.....	69	17	39.0	1.87
Fox Creek.....	74	28	42.6	1.53					
Glasgow.....	79	22	45.0	2.41					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Nebraska—Cont'd.	0	0	0	Ins.	New York—Cont'd.	0	0	0	Ins.
West Hill.....	65	10	36.5	0.96	Akron.....	63	12	35.5	1.60
West Point.....	72	16	35.9	0.40	Alfred Centre.....	63	12	35.5	1.60
Whitman.....	72	16	35.9	0.40	Apulia.....	64	13	35.9	3.59
Wilcox.....	72	16	35.9	0.40	Arcade (1).....	59	21	41.6	0.90
York.....	72	16	35.9	0.40	Ardenia.....	58	19	38.0	2.48
Nevada.					Arkwright.....	58	19	38.0	2.48
Battle Mountain.....	67	18	38.2	0.00	Au Sable Forks.....	63	12	35.5	1.60
Beowawe (1).....	70	10	36.6	0.00	Avon.....	63	12	35.5	1.60
Browns.....	66	26	40.1	0.00	Baldwinsville.....	63	12	35.5	1.60
Carlin.....	64	4	27.2	0.00	Bethlehem Centre.....	63	12	35.5	1.60
Elko (1).....	68	10	32.2	0.00	Blood's Depot.....	63	12	35.5	1.60
Fenelon.....	71	20	36.3	0.00	Boyd's Corners.....	65	18	40.7	1.12
Golconda.....	72	16	34.5	0.00	Brookport.....	68	18	37.8	3.98
Halleck.....	62	3	29.2	0.00	Brookfield.....	61	3	33.7	3.31
Hawthorne (1).....	65	35	46.5	0.00	Canton.....	68	8	33.2	4.06
Hot Springs (1).....	60	15	33.4	0.00	Central Park, N. Y.....	69	19	43.9	0.71
Humboldt (1).....	65	15	39.5	0.00	Chenango Forks.....	69	19	43.9	0.71
Palisades.....	72	12	34.8	0.20	Cherry Creek.....	69	19	43.9	0.71
Reno.....	66	20	40.0	0.00	Chittenango.....	69	19	43.9	0.71
Tecoma.....	65	18	31.7	0.00	Cooperstown.....	63	8	34.7	3.17
Toano.....	67	8	39.6	0.00	David's Island.....	70	11	40.8	0.69
Wadsworth.....	68	20	38.9	0.05	De Kalb Junction.....	63	8	34.7	3.17
Wells.....	78	12	32.4	0.05	Demster.....	63	8	34.7	3.17
Winnemucca.....	73	15	34.4	0.00	Dunkirk (1).....	64	20	41.3	1.30
New Hampshire.					Easton.....	64	20	41.3	1.30
Antrim.....	65	18	31.7	0.00	Fleming.....	64	11	38.6	1.93
Belmont.....	65	18	31.7	0.00	Fort Columbus.....	70	20	44.8	0.98
Berlin Falls.....	54	2	28.5	0.00	Fort Hamilton.....	69	20	44.6	0.60
Berlin Mills.....	55	2	29.6	0.00	Fort Niagara.....	63	24	41.8	2.79
Concord.....	64	8	35.6	1.49	Fort Porter.....	62	25	40.4	0.45
East Canterbury.....	58	10	31.8	1.60	Fort Schuyler.....	69	70	42.9	0.88

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>North Dakota.</i>				<i>Ins.</i>	<i>Oregon—Cont'd.</i>				<i>Ins.</i>
Fort A. Lincoln.....	65	37.8	0.07		McMinnville.....	74	24	44.8	0.44
Fort Buford.....	65	35.8	0.03		Mount Angel.....	73	26	44.2	0.51
Fort Pembina.....	65	35.4	0.30		North Powder.....	63	7	31.4	T.
Fort Totten.....	65	35.6	0.00		Pendleton.....	68	14	40.4	T.
Fort Yates.....	65	37.5	0.16		Slakiyou.....	60	37	47.7	0.00
Gallatin*.....	65	38.6	0.09		Tolocaset.....	60	37	47.7	0.00
Grand Forks.....	63	30.3	0.12		The Dalles.....	64	22	41.6	0.00
Kelso.....	60	32.9	0.20		<i>Pennsylvania.</i>				
Napoleon.....	67	32.5	0.20		Allegheny Arsenal.....	60	20	41.2	1.42
New England City.....	65	35.8	0.18		Altoona.....	69	22	47.2	1.07
Steele.....	72	34.8	0.10		Aqueduct*.....	63	18	43.3	0.32
Wahpeton*.....	60	34.8	0.62		Bethlehem.....	68	21	43.4	0.82
Wild Rice*.....	60	27.8	0.35		Blooming Grove*.....	69	16	39.2	0.60
<i>Ohio.</i>					Blue Knob*.....	68	10	37.8	0.78
Akron.....	65	25	42.3	3.26	Brookville.....	60	20	41.2	1.42
Ashland*.....	66	26	43.0	2.19	Browsers Lock.....	60	20	41.2	1.42
Athens.....	75	20	45.1	3.58	Cannonsburgh.....	66	15	42.7	1.91
Bangorville.....	65	20	41.6	3.52	Carlisle.....	66	19	42.5	0.81
Bellevue*.....	64	18	41.4	2.21	Catawissa*.....	64	22	43.0	1.17
Bement*.....	66	23	40.2	2.69	Chambersburgh.....	69	17	42.4	1.21
Caledonia*.....	65	20	41.6	3.42	Charlesville.....	73	15	42.5	1.57
Canton*.....	65	20	41.6	3.42	Clarion (1)*.....	63	17	41.7	1.77
Celina.....	68	24	43.6	2.62	Clarion (2)*.....	63	17	41.7	1.77
Circleville (1)*.....	68	24	43.6	2.62	Coatesville*.....	73	17	41.4	1.07
Circleville (2)*.....	68	24	43.6	2.62	Confluence*.....	60	21	41.7	0.95
Clarksville.....	69	31	44.3	3.91	Coopersburgh.....	69	21	41.7	0.95
Cleveland.....	68	28	43.9	3.14	Corry.....	68	14	38.7	1.09
Columbus Barracks.....	70	20	45.5	2.23	Doylestown.....	65	12	35.6	1.68
Dayton.....	69	22	45.3	2.27	Dyberry.....	65	12	35.6	1.68
Demos.....	69	21	42.2	2.53	Eagle's Mere.....	54	12	34.8	1.64
Ellsworth.....	68	28	43.6	2.72	Easton.....	61	20	38.8	1.26
Elyria.....	67	19	42.4	2.72	Edinborough*.....	67	18	41.5	2.16
Findlay.....	67	19	42.4	2.72	Emporium.....	67	18	41.5	2.16
Garrettsville.....	65	15	39.9	3.19	Ficks of Neshaminy.....	67	18	41.5	2.16
Georgetown.....	72	23	46.5	3.14	Frankford Arsenal.....	71	20	40.7	1.05
Gratiot*.....	68	11	43.8	2.27	Frederick.....	67	18	41.5	2.16
Greenville*.....	65	22	43.2	2.50	Freeport*.....	69	22	43.6	1.13
Hanging Rock.....	75	22	46.8	2.46	Germantown.....	69	22	43.6	1.13
Hansen*.....	68	20	45.1	2.90	Girardville.....	62	19	40.7	1.67
Hiram.....	64	19	40.2	3.27	Grampian Hills.....	68	16	39.2	1.73
Hudson.....	71	25	46.2	3.20	Greensborough*.....	66	14	41.4	2.02
Jacksonborough.....	64	22	40.4	2.94	Hamburg.....	71	20	42.7	1.48
Jefferson.....	69	30	43.8	2.61	Holidaysburgh.....	71	20	42.7	1.48
Kenton*.....	63	25	39.7	4.11	Honesdale.....	59	15	37.2	1.18
Leipsic*.....	74	20	45.0	2.31	Huntingdon.....	73	20	43.2	1.38
Logan.....	65	13	40.6	3.31	Indianapolis.....	70	15	40.4	2.14
Lordstown.....	65	13	40.6	3.31	Johnstown.....	65	22	44.4	1.22
Mansfield*.....	73	21	45.7	1.04	Kennett Square.....	65	22	44.4	1.22
Marietta (1)*.....	74	25	46.6	2.56	Kilmer*.....	68	38	43.1	1.04
Marietta (2)*.....	74	25	46.6	2.56	Lancaster.....	68	38	43.1	1.04
Marion.....	73	20	44.9	3.08	Lansdale*.....	65	16	38.0	0.89
McConnellsville.....	68	23	43.3	2.54	Le Roy*.....	64	19	42.0	1.21
Napoleon*.....	69	21	43.3	1.83	Lewisburgh.....	64	19	42.0	1.21
New Alexandria.....	70	20	43.5	1.53	Ligonier.....	64	19	42.0	1.21
New Comerstown.....	67	23	43.7	3.25	Lock Haven*.....	64	19	42.0	1.21
North Lewisburgh.....	67	23	43.7	3.25	Lock No. 4*.....	64	19	42.0	1.21
Oberlin.....	67	20	42.7	2.86	Mauch Chunk.....	66	17	39.0	1.00
O. S. University*.....	71	20	43.3	1.76	McConnellsburgh.....	66	17	39.0	1.00
Orangeville*.....	66	15	41.0	2.55	Meadville (2)*.....	65	15	40.2	2.81
Pomeroy.....	73	21	45.7	1.04	Meshoppen.....	67	19	40.5	1.23
Portsmouth (1)*.....	76	24	47.5	3.22	Myerstown.....	67	19	40.5	1.23
Portsmouth (2)*.....	76	24	47.5	3.22	New Castle.....	68	14	43.7	3.45
Shiloh*.....	68	21	43.0	2.70	Nisbet*.....	68	21	43.7	3.45
Springborough*.....	68	21	43.0	2.70	Oil City*.....	68	21	43.7	3.45
Tiffin.....	67	24	43.0	2.35	Ottawa.....	68	21	43.7	3.45
Upper Sandusky.....	67	23	43.8	1.86	Parker's Landing*.....	68	21	43.7	3.45
Vermont*.....	65	16	40.1	2.45	Petersburgh*.....	74	20	43.1	1.38
Wauseon.....	69	17	40.8	2.25	Phillipsburgh*.....	70	10	39.8	1.27
Waverly.....	75	26	48.1	2.34	Phoenixville.....	73	22	44.2	1.21
Waynesville.....	68	25	45.5	2.45	Pleasant Mount.....	73	22	44.2	1.21
Westerville.....	68	21	43.7	2.11	Point Pleasant.....	71	21	44.0	1.00
West Milton*.....	68	25	48.2	3.30	Pottstown.....	71	21	44.0	1.00
Weymouth.....	70	23	42.2	3.49	Quakertown.....	71	18	40.1	1.24
Wheeler.....	69	21	44.2	2.85	Reading.....	69	21	44.2	2.85
Wooster*.....	67	21	43.5	2.71	Rimersburgh.....	62	18	40.2	1.26
Yellow Springs.....	69	21	44.2	2.85	Salem Corners.....	65	18	40.7	1.87
Youngstown.....	67	21	43.5	2.71	Saltsburgh*.....	65	18	40.7	1.87
Zanesville.....	67	21	43.5	2.71	Seisholtzville.....	65	18	40.7	1.87
<i>Oklahoma Territory.</i>					Selin's Grove.....	60	18	40.5	1.54
Fort Reno.....	83	32	49.4	3.32	Smith's Corners.....	60	18	40.5	1.54
Fort Reno.....	86	37	50.4	4.06	Somerset.....	70	32	41.1	3.46
Fort Still.....	80	27	49.4	2.82	State College.....	66	17	41.4	1.46
Guthrie*.....	80	27	49.4	2.82	Swarthmore.....	71	32	43.4	0.88
<i>Oregon.</i>					Tipton*.....	70	21	42.4	1.57
Albany*.....	73	25	44.3	0.44	Troy*.....	61	20	39.1	0.70
Ashland (1)*.....	68	24	41.9	0.05	Uniontown.....	78	20	47.8	2.25
Ashland (2)*.....	74	22	46.2	0.05	Warren*.....	78	20	47.8	2.25
Bandon*.....	67	32	51.2	0.33	Wellaborough*.....	65	16	36.2	0.93
Boulah.....	68	8	34.2	0.00	West Chester.....	71	20	44.2	1.23
Corvallis.....	73	22	43.6	0.22	Westtown.....	70	22	43.4	0.97
East Portland.....	71	29	45.2	1.42	Wilkes Barre.....	66	17	39.0	0.81
Eola.....	61	26	44.1	0.25	Wysox.....	66	17	39.0	0.81
Eugene.....	61	26	44.1	0.25	York.....	68	19	43.2	0.80
Forest Grove.....	74	26	44.8	0.70	<i>Rhode Island.</i>				
Gardiner.....	64	36	49.4	0.36	Bristol.....	64	16	41.7	0.85
Gold Beach.....	72	38	53.3	0.10	Fort Adams.....	58	15	40.2	1.20
Grant's Pass.....	75	12	42.8	0.18	Kingston (1)*.....	59	13	41.3	0.95
Hardman.....	64	24	42.8	T.	Kingston (2)*.....	59	13	41.3	0.95
Heppner*.....	71	21	42.5	0.11	Lonsdale.....	64	19	44.3	0.68
Hood River.....	63	27	43.9	0.06	Olneyville.....	70	16	43.8	0.74
Hubbard.....	72	24	43.5	0.50	Pawtucket.....	64	19	44.3	0.74
Jacksonville.....	68	27	44.1	0.18	Providence (1)*.....	67	16	42.2	0.74
Joseph.....	66	18	37.0	0.44					
La Grande.....	68	20	43.9	0.23					
Lakeview.....	75	20	44.2	T.					
Lone Rock.....	68	22	42.8	0.12					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)				Precip'n.	Stations.	Temperature. (Fahrenheit.)				Precip'n.
	Max.	Min.	Mean.				Max.	Min.	Mean.		
<i>Rhode Island—Con.</i>	o	o	o		<i>Ins.</i>	<i>Texas.</i>	o	o	o	<i>Ins.</i>	
Providence (2).....	68	13	40.9	0.78		Austin (1).....	84	36	58.6	1.25	
<i>South Carolina.</i>						Austin (2).....	83	39	59.5	0.45	
Allendale.....	79	32	59.2	0.91		Austin (3)*.....	86	37	57.6	2.23	
Batesburgh.....	75	31	59.8	0.25		Brady.....	86 d	30	54.2	0.43	
Belmont.....	76	26	56.4	0.22		Berlin.....	86	32	52.3	3.92	
Blackville.....	80	30	58.6	0.80		Brasoria 1*.....	83	31	60.4	1.80	
Branchville.....	82	26	56.7	0.76		Brenham†.....	89	36	61.4	1.83	
Brewer Mine.....	80	28	56.0	1.35		Brownwood†.....	85	30	55.5	2.91	
Camden*.....	70	23	50.2	1.05		Burnet.....	77	35	56.5	2.47	
Cheraw f.....	84	24	54.6	0.65		Camp Eagle Pass ..	90	32	61.8	1.15	
Chester.....	83	36	61.8	0.12		C'p Peña Colorado..	80	16	46.2	0.48	
Conway.....	84	28	57.1	0.18		Coldwater.....	79	14	43.8	0.37	
Evergreen*.....	76	20	50.0	0.11		College Station.....	89	37	61.2	0.99	
Florence*.....	78	28	57.9	1.56		Colorado.....	87	32	55.4	1.02	
Greenville†.....	81	30	55.6	0.05		Columbia.....	85	33	62.6	3.96	
Greenwood.....	79	30	57.6	0.00		Coriscana (1).....	80	32	55.6	2.19	
Hardeeville*.....	80	36	62.4	0.46		Coriscana (2).....	86	30	58.7	0.18	
Jacksonborough†.....	84	32	60.4	0.62		Dallas (2)†.....	80	34	57.6	2.79	
Kingstreet.....	82	28	58.0	T.		Durham†.....	84	36	59.5	1.85	
Kirkwood*.....	82	23	49.4	1.05		Duval.....	78	33	52.7	2.20	
McCormick.....	80	39	61.6	0.19		Epworth†.....	78	33	52.7	2.20	
Port Royal*.....	80	39	61.6	0.19		Forestburgh*.....	86	25	51.9	0.42	
Saint George's.....	86	32	58.4	0.89		Fort Bliss.....	87	42	65.6	1.88	
Saint Matthew's†.....	82	26	56.4	1.23		Fort Brown.....	84	38	59.3	1.44	
Simpsonville*.....	80	25	55.7	0.12		Fort Clark.....	75	22	49.5	0.16	
Spartanburgh (1).....	75	35	54.2	0.00		Fort Davis.....	85	9	49.2	0.35	
Spartanburgh (2)†.....	82	26	57.2	0.04		Fort Hancock.....	89	26	60.9	0.16	
Statesburgh.....	78	33	58.2	0.90		Fort McIntosh.....	85	33	64.6	0.28	
Trials*.....	76	32	57.0	0.57		Fort Ringgold.....	90	28	58.0	1.18	
Walhalla.....	73	28	55.0	0.55		Gallinas†.....	82	25	50.6	3.30	
Windsorrough.....	82	32	59.0	1.84		Graham.....	82	34	57.6	2.79	
Yorkville.....	80	27	55.6	0.26		Grapevine*.....	86	34	57.6	2.79	
<i>South Dakota.</i>						Hansford.....	66	20	41.2	0.25	
Aberdeen.....	63	1	31.2	0.40		Hartley.....	85	18	43.1	0.30	
Alexandria†.....	68	—	1	0.50		Hearne†.....	82	32	57.8	2.04	
Canton†.....	65	7	36.1	1.36		Houston†.....	87	30	60.5	3.50	
Clark.....	64	4	33.2	0.22		Hustville†.....	85	33	59.3	3.52	
Cross.....	74	16	35.8	0.68		La Grange*†.....	85	43	61.2	0.00	
De Smet*.....	53	11	29.9	0.79		Lampasas.....	84	29	57.0	2.26	
Flandreau.....	75	4	33.2	0.53		Longview†.....	81	33	57.4	3.79	
Fort Bennett.....	75	0	38.0	0.59		Luling.....	86	32	60.6	0.95	
Fort Meade.....	70	10	39.2	0.40		Menardville*.....	84	31	51.8	1.74	
Fort Randall.....	75	10	39.7	0.64		Mesquite.....	82	32	55.6	3.82	
Fort Sully.....	67	3	40.6	0.80		Mountain Springs.....	33	34	55.6	5.08	
Highmore.....	69	0	35.7	0.30		New Braunfels.....	85	30	59.3	0.63	
Howard.....	65	9	37.0	0.45		New Ulm.....	88	39	61.0	1.20	
Kimball*.....	62	2	30.4	0.68		Orange†.....	82	30	59.2	1.90	
Millbank.....	78	6	37.9	0.30		Panhandle.....	82	20	45.8	0.52	
Onida*.....	69	4	31.9	0.55		Panther.....	88	33	55.9	3.47	
Sioux Falls.....	70	10	35.4	0.45		Paris.....	82	34	56.7	3.03	
Saint Lawrence*.....	66	6	33.4	0.58		Round Rock.....	82	30	59.4	2.35	
Sheridan*.....	60	0	32.9	0.35		San Antonio.....	85	37	60.9	1.00	
Sioux Falls*.....	60	0	32.9	0.35		Silver Falls.....	86	30	52.4	1.34	
Spearfish.....	69	18	43.9	0.35		Tyler†.....	82	34	58.0	2.32	
Vermillion*.....	69	10	34.1	0.58		Venus.....	83	27	54.9	3.13	
Webster.....	70	7	35.3	3.20		Waco (2)†.....	88	34	58.6	1.95	
Wolsey*.....	68	—	2	0.58		Weatherford.....	86	26	56.6	5.27	
Woonsocket.....	69	—	6	0.47		<i>Utah.</i>					
<i>Tennessee.</i>						Alta.....	14	30.0	0.00		
Andersonville.....	76	23	49.4	0.90		Beaver†.....	85	10	30.0	0.27	
Arlington†.....	76	32	51.8	3.75		Bingham.....	14	32.0	0.00		
Ashwood*†.....	76	28	52.3	1.06		Blue Creek*.....	56	27	38.7	0.00	
Austin*.....	76	24	52.9	1.57		Corinne.....	59	15	35.6	0.00	
Bolivar (1).....	78	30	55.0	0.30		Fort Douglas.....	65	24	40.6	0.00	
Bolivar (2).....	78	26	53.6	0.30		Fort DuChesne.....	60	10	34.6	0.03	
Brownsville.....	78	30	53.8	3.58		Kelton*.....	57	15	34.2	0.00	
Carthage†.....	77	31	54.4	1.68		Logan*.....	68	18	36.5	1.15	
Charleston†.....	77	31	54.4	1.68		Moab.....	77	16	39.8	1.05	
Clarksville.....	80	26	50.7	2.45		Mount Carmel*.....	15	31.2	0.27		
Clinton†.....	77	32	53.2	0.30		Mount Pleasant.....	49	13	28.4	0.41	
Columbia†.....	77	32	53.2	0.80		Nephi†.....	67	7	35.0	0.00	
Covington (1)†.....	75	30	53.2	6.49		Ogden (1).....	58	24	37.1	0.00	
Covington (2)†.....	75	32	53.1	5.78		Ogden (2)†.....	20	37.1	0.00		
Cumberland Gap.....	74	26	48.1	1.11		Park City.....	15	31.6	0.00		
Dare.....	77	32	50.6	0.00		Price†.....	78	13	39.7	0.43	
Dyersburgh (2).....	76	27	52.3	4.47		Promontory.....	69	18	38.5	0.00	
Ely.....	76	28	53.1	0.99		Provo City.....	20	33.2	0.00		
Florence Station.....	75	30	51.7	1.14		Richfield.....	67	11	36.0	T.	
Franklin.....	78	28	51.5	1.87		Saint George.....	84	14	50.5	1.24	
Grand Junction.....	77	30	54.2	3.72		Snowville.....	62	37	49.9	0.00	
Greeneville.....	75	23	48.5	0.15		Stockton.....	11	30.6	0.00		
Johnswood.....	80	23	54.2	2.05		Terrace*.....	65	20	38.7	0.00	
Jacksonborough.....	74	23	52.3	0.66		Uintah.....	24	32.2	0.00		
Johnsonville†.....	77	31	53.8	2.33		<i>Vermont.</i>					
Kingston (1)†.....	77	31	53.8	T.		Brattleborough (1).....	61	10	36.6	1.56	
Kingston Springs.....	80	28	52.9	2.75		Brattleborough (2).....	63	14	39.8	3.73	
Kewburg.....	76	26	50.1	0.90		Burlington.....	59	15	36.0	2.31	
Knokout Mountain.....	74	30	53.9	0.22		Chelsea*.....	62	10	31.9	2.25	
Landon†.....	77	32	54.0	0.25		Cornwall.....	59	10	31.9	1.28	
McKenzie.....	80	32	54.0	4.58		East Berkshire†.....	58	4	30.0	4.25	
Millan (2)†.....	77	26	52.5	4.09		Hartland.....	62	7	35.2	2.09	
Missionary Ridge*.....	77	31	52.4	2.24		Jacksonville.....	60	6	31.8	2.50	
Munell.....	78	24	52.2	2.24		Lunenburg*.....	60	12	35.2	2.46	
Norfolkville.....	76	26	52.9	0.00		Saxton's River.....	60	4	33.7	0.00	
Norfolkville.....	76	26	52.9	0.00		Stratford*.....	54	10	34.6	2.00	
Norfolkville.....	77	23	50.7	1.66		Vernon.....	64	8	36.1	1.96	
Norfolkville.....	77	23	50.7	1.66		Weatherfield C'tre.....	56	8	33.0	0.00	
Norfolkville.....	77	23	50.7	1.66		<i>Virginia.</i>					
Norfolkville.....	77	23	50.7	1.66		Abingdon.....	78	26	51.7	T.	
Norfolkville.....	77	23	50.7	1.66		Birdsneat*.....	70	17	43.0	0.57	
Norfolkville.....	77	23	50.7	1.66		Bolar*.....	73	25	49.3	0.17	
Norfolkville.....	77	23	50.7	1.66		Casanova.....	73	25	49.3	0.17	

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Virginia—Cont'd.	0	0	0	Ins.	Wisconsin.	0	0	0	Ins.
Christiansburg f.	75	22	49.4	0.05	Butternut f.	18	27.7	0.94	
Dale Enterprise f.	73	22	46.6	0.55	Cadiz	26	36.6	1.22	
Fall Creek Depot	74	29	52.6	0.00	Chippewa Falls			0.48	
Fort Monroe	75	30	51.6	0.00	Delevan			2.98	
Fort Myer	73	22	46.8	0.84	De Pere	60	22	37.0	
Lexington f.	78	19	47.9	0.63	Embarrassa	56	15	34.3	1.85
Marion	73	26	46.2	0.43	Fond du Lac	55	17	35.4	1.99
Mossing Ford	73	22	46.3	0.20	Glasgow	56	17	35.2	1.91
Nottoway C. H.	82	19	49.8	0.13	Grantsburgh	60	14	36.2	0.71
Petersburgh f.	81	25	49.4	0.06	Greenwood	54	12	32.2	1.02
Richmond f.	85	23	53.9	0.11	Hayward	70	7	34.8	0.91
Salem	81	30	53.8	0.10	Honey Creek	56	22	37.8	1.92
Stanardsville	72	23	53.0	0.16	Ithaca		20	36.8	1.88
Staunton	78	19	47.9	0.38	Koepenick			0.90	
Summit	72	18	44.2		Lincoln	28	37.6	2.40	
Woodstock f.				0.51	Madison	53	23	38.4	1.93
Wytheville	70	26	49.0	0.49	Manitowoc	58	19	39.9	1.81
Yancey's Mills	76	18	48.19	0.47	Medford (1) f.			0.80	
Washington.					Medford (2)	53	10	31.2	
Blakeley f.	58	34	46.6	0.56	Neillsville	56	9	31.6	0.22
Chehalis	64	30	46.8	0.73	Oshkosh f.	57	21	36.2	2.18
Doe Bay f.	58	36	46.1	1.27	Peshigo	54	14	33.3	0.84
East Sound f.	56	36	47.2	1.47	Phillips f.			0.71	
Fairhaven A.	68	32	48.4		Plover	58	13	33.3	1.46
Fort Canby	73	36	51.4	1.94	Portage f.			1.33	
Fort Simcoe f.	65	32	46.2	0.05	Wauzeka		28	34.7	2.20
Fort Spokane	62	18	35.6	0.00	Wyoming.				
Fort Townsend	59	31	46.1	0.96	Camp Pilot Butte	66	—11	27.8	0.54
Fort Walla Walla	69	22	43.4	0.00	Camp Sheridan		2	0.49	
Lapush	58	17	37.8	3.86	Fort D. A. Russell	70	2	34.7	0.13
Seattle	60	34	46.8	0.69	Fort Fetterman	70	5	28.9	0.34
Tacoma	57	34	47.2	0.88	Fort McKinnay	70	10	42.2	T.
Vancouver B'ks	79	26	45.6	0.80	Fort Washakie	70	9	34.5	0.06
Vashon	63	36	52.2	0.09	Laramie	60	0	29.2	0.40
Waterville	63	5	36.6	T.	Lusk	65	8	36.5	T.
West Virginia.					British Columbia.				
Buckhannon f.				2.54	New Westminster	60	32	44.6	4.20
Charleston f.				1.84	Mexico.				
Ella	66	23	44.0	2.43	La Logia	96	52	75.9	0.45
Glenville				2.89	Leon de Aldemas	77	41	58.2	0.78
Harper's Ferry f.				0.69	Mazatlan	86	70	77.7	1.02
Hinton f.				0.84	Mexico	72	39	55.0	0.47
Kingwood	68	12	41.8		Pueblo	81	37	56.7	0.51
Mount Alto		16	42.4		Topolobampo	88	64	76.0	0.15
Morgantown				2.67	Zacatecas	74	30	51.8	1.18
Pleasant Hill	70	12	38.8		New Brunswick.				
Point Pleasant f.				2.97	Saint John	53	16	35.7	3.50
Rowlesburgh f.				2.22	New Brunswick.				
Tannery	75	14	44.8		Saint John's	55	20	36.4	4.58
Tyler's Creek	69	28	51.2	3.46	West India.				
Weston				2.94	Grand Turk Island	84	81	82.9	2.98
Wheeling f.				1.33	Hamilton, Berl	76	56	67.1	2.33
White Sulph' Sp'gs.				0.90					

Received too late for general discussion of weather for November, 1890.

Arizona.					Nevada—Cont'd.				
Eagle Pass	28	40.4	1.34		Ely	64	9	37.3	0.00
California.					Eureka	63		0.04	
Crescent City L. H.			0.00		Hawthorne (2)	69	25	42.9	0.00
East Brother L. H.			0.00		Lewers Ranch	72	22	42.3	0.29
Farrall L. H.			0.00		Milla City	68	16	36.4	
Humboldt L. H.			0.43		Palmetto	69	18	42.0	0.25
Pt. Ana Nuevo L. H.			0.00		Pioche	68	5	33.0	0.07
Pt. Arena L. H.			0.12		Tybo	80	9	44.5	T.
Pt. Boneta L. H.			0.00		Vardi	60	18	36.7	0.10
Pt. Conception L. H.			0.50		Virginia City	64	24	45.2	0.03
Pt. Montaro L. H.			0.00		Younts Ranch	76	17	52.0	1.50
Pt. Reyes L. H.			0.00		New Hampshire.				
Yerba Buena L. H.			0.00		North Sutton		10	32.4	1.54
Colorado.					New York.				
Castle Rock	76	10	38.9	0.30	Apalachin	67	14	38.7	1.28
Crook			0.55		Constableville	61	5	31.7	4.72
Greenhorn	70	18	35.4	1.02	Dunkirk (2)			3.06	
Ricot			1.50		Elmira			0.86	
Sheridan Lake			0.09		Hess Road Station	64	18	38.6	4.83
Florida.					Lyon Mountain (2)			3.82	
Archer	89	33	65.7	0.94	Middleburgh	71	6	37.3	3.00
Homeland	85	44	70.1	3.90	Minnewaska	58	11	35.0	0.45
Manatee	90	40	69.2	2.30	North Hammond	65	18	34.4	2.85
Idaho.					Pompey	58	13	33.6	
Bonanza	55	0	27.6	0.40	Saratoga	58	11	36.6	
Placerville	77	6	28.8		Sherman			3.26	
Indiana.					South Kortright f.	62	10	34.6	1.81
Marengo	71	27	49.5	6.01	Waverly	63	13	38.0	0.97
Iowa.					Wedgwood	67	14	35.6	1.58
Alta (2)	61	18	36.7	1.14	North Carolina.				
Kansas.					Douglas	78	19	50.6	0.40
Buffalo Park	73	30	0.55		Franklin	79	12	46.6	0.00
Toronto			4.37		Marion	83	21	52.3	0.70
Nevada.					Pittsborough	75	22	51.3	0.20
Beaver City	72	16	42.1	1.00	Salisbury	75	33	55.8	0.13
Fairfield	73	16	41.5	1.23	Smithfield	78	23	52.6	0.20
Nevada.					Willeton	79	22	52.2	0.25
Austin	62	17	40.2	0.10	Pennsylvania.				
Belmont	66	19	40.6	0.09	Davis Island Dam f.			1.29	
Candelaria	65	22	43.6	0.00	Philadelphia			0.92	
Carson City	73	13	37.0	0.01	South Easton	61	17	40.2	0.78
Columbus Marsh	81	12	37.4	0.00	Texas.				
Crane's Ranch			0.00		Childress			T.	
Downeyville	74	1	44.8	T.	Fredericksburgh	81	30	55.0	1.85
El Dorado Canyon	86	46	63.2	1.41	Merkel		26	47.2	2.94

Received too late for publication in October, 1890.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Alabama.	0	0	0	Ins.	Nebraska.	0	0	0	Ins.
Florence	85	30	61.6	2.04	Crawford	89	30	49.2	0.00
Greensborough	86	36	62.8	3.15	Crete	79	25	51.0	1.64
Jasper	83	31	61.3	3.16	Gering	78	23	49.4	0.16
Mount Willing	84	31	63.5	0.50	Grand Island	64	24	45.3	0.64
Tusculumbia (1)	85	34	57.9	3.15	Holdrege	73	26		0.40
Union Spring	86	43	65.6	0.55	Nevada.				
Uniontown	87	36	64.1	3.21	Austin	69	25	45.6	0.61
Arizona.					Belmont	69	27	47.8	0.32
Antelope Valley				2.02	Candelaria	71	25	49.9	0.25
Cottonwood				0.36	Columbus Marsh	81	23	52.0	0.50
Simmons				0.30	Crane's Ranch				0.11
Springville				0.25	Downeyville	77	30	52.6	1.25
Texas Hill	96	51	72.8	0.03	El Dorado Canyon	92	48	71.8	T.
California.					Elko (1)	72	24	44.8	0.00
Borden	87	49	66.0	0.00	Ely	69	15	42.2	0.37
Brentwood	90	48	68.2	0.02	Genoa	81	27	51.9	
Crescent City L. H.				0.96	Hawthorne (2) A.	79	28	53.1	0.12
Cottonwood	84	44	60.1	0.00	Lewers Ranch	76	27	52.2	0.05
East Brother L. H.				0.00	Mill City	84	30	51.7	
Edgewood	69	30	48.0	0.22	Palmetto	75	24	47.5	T.
Farrall L. H.				0.00	Pioche	73	8	40.2	0.88
Humboldt L. H.				0.02	Punch Bowl	64	24	43.8	0.00
Mount Hamilton	81	32	58.1	0.02	Toano	72	20	47.2	0.15
National City	98	45	66.6	0.00	Tybo	82	21	49.6	0.41
Pleasanton	79	49	58.8	0.00	Verdi	68	30	48.4	0.00
Pt. Ana Nuevo L. H.				0.25	Virginia City	70	24	51.0	0.25
Pt. Boneta L. H.				0.00	Younts Ranch	82	41	60.0	0.00
Pt. Conception L. H.				0.00	New Mexico.				
Pt. Montara L. H.				0.00	Coolidge	83	19	48.2	1.00
Pt. Reyes L. H.				0.00	La Luz	81	38	59.2	0.67
Santa Maria	92	33	61.8	0.70	Springer				0.65
Truckee (1)	68	16	36.8	0.10	New York.				
Tropico	100	46	68.1	0.00	Arcade (1)	73	27	45.3	5.98
Willow (2)	98	36	64.3	0.00	Ilion f.	75	28	48.1	5.76
Yerba Buena L. H.				0.00	Middleburgh	85	28	48.3	5.50
Colorado.					North Carolina.				
Alford f.				0.96	Hot Springs	81	30	56.4	
Boulder Canon				0.60	Raleigh	88	35	61.0	3.85
Canon City f.	80	28	54.0	0.05	Oregon.				
Pagoda (near) f.	69	12	41.3	0.24	Happy Valley	76	12	42.4	0.09
Westcliffe	68	1	42.7	0.07	Pennsylvania.				
Connecticut.					Easton				5.65
Meriden		30			Mesheppen				2.30
Florida.					Rhode Island.				
Pine Level		56	74.6	1.83	Fort Adams	80	34	52.6	3.91
Georgia.					Providence (1)	74	35	50.8	9.19
Woolley's Ford	77	30	55.4		South Dakota.				
Idaho.					Highmore	81	19	47.9	0.32
Lewiston	75	30	46.5	0.73	Webster	77	26	47.4	1.88
Illinois.					Texas.				
Irishtown				0.60	Austin (1)	90	46	68.6	3.12
Jordan's Grove	87	26	55.2	0.62	Burnet f.	84	48	67.3	2.70
Iowa.					Childress	94	43	67.6	1.73

Precipitation (inches and hundredths) observed at Key West, Fla.—Cont'd.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1843	.....	.....	.....	.....	1.03	1.85	1.20	2.99	4.65	6.83	0.90	1.31	.....
1844	0.32	1.23	0.13	0.05	1.30	7.13	1.28	2.03	8.50	14.07	0.44	1.28	38.40
1845	4.42	0.14	3.67	2.06	4.33	0.07	5.00	.....	.....	.....	.....	.....	.....
1849	.....	.....	.....	.....	.....	.....	2.02	3.38	3.93	4.18	0.01	2.10	.....
1850	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1851	2.40	0.88	1.50	1.80	3.89	8.19	2.78	0.78	12.37	9.23	1.55	2.32	53.69
1852	1.47	2.46	6.80	1.93	0.23	6.87	5.83	5.81	5.03	4.19	2.03	3.16	46.41
1853	2.23	0.43	0.62	0.62	17.06	2.05	4.01	3.70	4.86	9.27	3.12	0.23	44.65
1854	1.76	2.85	0.77	2.68	2.05	4.06	4.22	6.08	7.62	5.62	3.92	2.51	44.64
1855	4.03	1.16	1.15	0.42	2.66	2.15	7.59	3.00	6.30	6.08	1.28	0.36	40.28
1856	5.05	3.74	1.05	0.42	0.71	2.08	11.00	3.84	9.11	4.39	1.10	0.81	38.87
1857	0.65	0.86	1.73	1.69	0.71	2.08	3.39	1.95	2.49	1.22	2.90	0.91	35.75
1858	1.77	2.43	1.70	0.25	3.45	7.29	3.39	1.95	2.49	1.22	2.90	0.91	35.75
1859	2.39	0.70	0.05	0.19	0.28	0.44	2.99	5.35	10.48	.....	.....	.....	.....
1860	0.54	1.12	2.55	2.53	2.90	9.38	2.70	3.26	2.74	3.48	0.38	2.68	30.54
1861	0.32	0.74	0.59	1.38	2.50	4.06	3.75	6.38	3.23	4.91	0.95	0.17	33.62
1862	2.84	1.30	0.55	2.38	2.50	1.47	2.30	2.17	0.25	2.85	1.50	7.92	30.61
1863	0.60	0.67	0.02	0.70	0.45	3.85	5.93	8.08	2.05	.....	0.15	4.45	.....
1864	5.45	3.80	1.84	2.75	0.71	2.42	4.00	9.83	7.41	4.41	0.60	6.60	41.41
1865	2.20	0.10	3.02	0.00	0.64	15.94	7.42	13.00	9.22	8.22	3.32	5.24	71.26
1866	3.20	2.06	3.00	0.00	0.64	15.94	7.42	13.00	9.22	8.22	3.32	5.24	71.26
1867	0.39	0.39	0.08	0.02	7.22	2.62	5.76	3.43	6.30	3.25	1.90	3.32	34.68
1868	1.60	7.19	1.04	0.08	1.01	2.24	6.92	4.82	3.15	2.09	0.98	0.65	31.77
1869	3.91	0.16	0.04	0.06	1.01	2.24	6.92	4.82	3.15	2.09	0.98	0.65	31.77
1870	2.90	1.73	0.11	1.55	2.78	4.54	3.03	3.78	7.42	3.43	1.21	0.27	32.75
1871	1.34	0.38	0.07	2.29	4.27	1.24	2.15	9.20	10.67	2.95	1.13	0.66	36.35
1872	0.51	1.65	0.42	0.60	3.32	5.97	5.48	4.38	3.13	9.27	2.50	0.72	37.95
1873	0.91	2.61	1.17	0.46	4.53	3.92	2.14	5.51	8.04	5.46	1.03	1.06	49.03
1874	5.26	4.74	2.95	1.02	2.66	5.12	7.06	4.03	8.04	5.46	1.03	1.06	49.03
1875	4.28	3.13	0.45	0.65	5.11	7.20	1.46	5.61	9.71	14.20	2.24	4.50	58.54
1876	1.20	0.33	0.33	0.33	7.84	1.81	4.61	7.30	3.59	2.81	1.95	0.91	33.40
1877	3.65	0.35	0.40	4.99	4.01	7.46	5.97	6.91	10.71	1.99	4.62	1.97	53.10
1878	1.33	0.40	0.01	3.93	7.46	3.48	4.45	4.97	6.16	4.81	2.94	1.92	41.86
1879	2.82	0.80	0.87	0.54	5.58	3.29	1.51	6.08	5.17	19.77	0.84	0.97	48.24
1880	1.82	1.70	0.80	0.98	4.56	2.35	3.16	7.08	3.17	6.03	1.73	33.05	.....
1881	4.09	4.07	1.19	0.47	4.48	3.58	3.15	2.55	5.33	5.07	0.43	1.68	34.03
1882	1.45	1.30	1.30	1.99	2.48	8.22	5.52	2.14	7.10	3.32	0.13	0.83	30.13
1883	0.77	0.90	1.99	0.78	2.48	8.22	5.52	2.14	7.10	3.32	0.13	0.83	30.13
1884	0.37	0.51	0.91	1.15	1.08	0.88	9.04	2.00	5.45	3.42	4.74	4.26	35.58
1885	2.42	1.05	6.89	1.15	1.08	6.48	1.51	9.40	13.87	3.16	5.38	2.48	52.67
1886	1.06	2.17	2.17	1.11	3.84	3.33	3.70	2.25	16.14	.....	.....	.....	.....
Mean...	2.14	1.61	1.41	1.28	3.12	4.58	3.99	5.06	6.53	4.95	2.08	1.99	39.07

Mean temperature (degrees Fahr.) observed at Strafford, Vt., by H. F. J. Scribner, voluntary observer.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1873	.....	.....	24.6	39.0	52.5	66.6	69.7	64.4	59.5	47.8	23.4	23.1	.....
1874	15.0	19.4	28.4	34.9	54.0	64.9	70.6	67.2	62.4	47.2	32.8	23.1	43.5
1875	12.9	11.6	24.0	35.7	55.1	65.5	67.4	70.6	56.2	43.7	25.8	21.6	40.5
1876	24.4	17.8	24.9	38.9	53.6	65.0	71.3	70.6	56.2	44.2	35.7	13.5	43.5
1877	13.3	25.7	27.7	43.3	55.0	66.8	68.4	69.2	62.2	46.2	36.2	27.7	45.2
1878	17.4	22.7	33.8	45.5	56.3	63.4	70.8	66.3	60.6	50.2	33.7	21.5	45.2
1879	15.0	15.0	25.8	39.1	51.0	64.4	69.2	65.6	60.4	52.8	31.2	22.0	43.5
1880	24.7	21.8	26.1	42.9	59.8	64.7	69.4	66.5	60.4	45.1	30.9	16.3	44.1
1881	11.3	16.0	21.9	39.2	59.3	68.4	67.0	69.6	60.1	48.0	34.9	29.5	43.7
1882	15.0	22.7	37.8	50.5	66.2	69.5	69.4	68.7	66.6	51.8	34.6	20.0	43.5
1883	10.6	15.8	17.2	39.9	57.0	68.8	70.4	68.7	66.6	44.9	36.7	18.7	42.3
1884	12.3	13.0	25.9	40.9	54.3	71.1	68.7	72.6	63.4	46.1	33.3	23.2	44.6
1885	15.7	11.0	17.9	42.3	56.0	64.7	68.6	63.9	58.0	47.9	34.7	22.5	42.0
1886	16.0	16.4	25.9	48.3	55.6	63.9	70.6	68.1	60.0	49.0	37.9	17.3	44.1
1887	12.9	17.5	22.3	37.6	63.0	66.2	73.5	65.8	56.5	45.9	32.8	22.2	43.0
1888	6.9	17.4	22.3	37.9	63.0	68.3	68.8	64.4	57.4	40.6	35.4	25.6	41.6
1889	25.4	14.2	32.6	46.5	60.8	66.8	68.3	65.9	61.1	43.6	37.1	28.8	45.9
1890	22.3	22.1	24.8	41.5	54.4	63.8	68.4	65.9	59.0	45.6	34.5	.....	.....
Mean...	15.9	18.2	25.6	41.6	56.3	65.8	69.5	67.5	59.6	46.7	33.4	22.2	43.5

Precipitation (inches and hundredths) observed at Southport (Smithville), N. C.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1875	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1876	0.44	3.07	5.66	2.70	3.95	3.38	4.85	6.36	9.91	8.89	1.98	5.14	56.33
1877	2.98	3.77	5.73	5.18	2.55	5.19	4.51	3.78	11.87	7.86	8.29	2.04	56.88
1878	6.90	1.36	0.87	2.13	4.36	5.61	6.97	6.05	7.76	8.29	2.04	2.16	56.88
1879	2.13	4.76	1.70	3.59	3.82	1.75	10.21	6.12	6.71	3.02	3.18	2.03	49.08
1880	0.03	4.59	2.81	3.49	1.36	2.05	5.69	7.49	4.33	6.62	4.77	2.88	50.13
1881	0.03	2.31	3.92	4.70	2.25	0.52	10.65	3.49	4.24	2.83	4.25	5.19	50.04
1882	3.30	1.64	7.81	1.63	1.17	2.76	4.04	8.33	2.26	9.45	2.50	3.53	48.27
1883	0.03	2.33	6.13	5.45	3.60	6.95	2.20	2.58	6.94	1.19	0.35	1.57	46.67
1884	3.44	2.88	2.80	3.71	1.43	2.31	7.32	5.38	3.11	0.23	1.81	2.93	36.00
1885	3.44	1.70	2.18	1.91	6.10	2.35	2.31	5.92	6.94	7.18	4.33	3.51	48.07
1886	2.14	2.16	5.46	3.10	1.46	3.68	11.99	3.36	0.52	1.16	0.76	3.14	38.93
1887	3.00	1.83	0.82	2.27	4.93	9.74	7.61	12.53	1.28	4.08	3.68	7.78	59.55
1888	2.76	6.25	7.05	1.41	3.46	2.33	3.72	9.25	8.14	6.98	0.30	3.10	60.85
1889	6.18	3.11	5.01	2.04	3.04	6.62	6.22	3.71	1.80	4.98	2.18	0.20	44.99
1890	0.89	1.76	1.53	1.86	4.75	2.23	12.05	3.52	8.36	.....	.....	.....	.....
Mean...	3.64	2.97	3.96	2.93	3.21	3.82	6.69	5.86	5.68	5.12	3.16	3.52	50.56

Precipitation (inches and hundredths) observed at Charleston, S. C., by Drs. Lining, Chalmers, Dawson; U. S. Army surgeons (Fort Moultrie), Dr. Johnson, John Ryan, and Signal Service observers.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	
1738 ...	1.10	4.42	4.53	1.08	3.13	1.57	10.66	4.10	10.79	1.36	2.66	3.88	49.28	
1739 ...	2.31	2.88	5.61	0.20	5.12	15.84	5.45	12.21	4.83	6.59	1.24	3.69	65.97	
1740 ...	4.87	3.08	1.14	1.09	5.61	4.65	3.03	7.30	3.20	1.26	1.85	2.74	39.80	
1741 ...	4.49	4.62	5.71	1.31	4.84	5.54	3.40	7.45	2.90	3.40	2.96	1.92	52.06	
1742 ...	2.19	1.05	5.20	0.92	5.90	3.25	1.25	7.65	2.90	0.76	3.39	0.96	36.02	
1743 ...	3.17	2.44	0.62	5.29	2.54	1.90	7.74	3.77	4.69	1.67	3.22	2.71	39.76	
1744 ...	1.99	3.06	0.58	2.87	2.87	5.81	8.44	4.30	0.75	2.96	0.68	2.62	50.13	
1745 ...	0.86	7.74	3.23	3.84	1.83	9.51	6.77	9.34	0.75	0.51	3.59	3.92	39.66	
1746 ...	1.14	2.70	1.63	1.13	3.99	4.11	9.39	9.11	7.22	9.50	1.06	2.92	44.56	
1747 ...	3.43	2.86	2.58	0.29	0.92	2.47	8.21	6.88	7.44	5.55	5.27	5.59	51.60	
1748 ...	2.21	1.57	3.05	0.93	1.83	1.86	9.27	6.88	7.44	5.55	5.27	5.5	54.44	
1749 ...	1.05	4.52	7.48	1.76	5.56	4.69	6.22	11.12	11.30	5.00	3.14	4.01	56.17	
1750 ...	2.56	3.14	0.94	2.31	2.37	8.69	5.69	5.59	5.35	0.68	2.41	50.80	42.88	
1751 ...	0.00	5.37	1.34	2.31	5.53	2.40	6.54	12.14	11.67	1.20	0.81	2.04	47.36	
1752 ...	3.60	0.80	1.72	0.44	2.79	2.62	1.48	10.72	14.66	1.45	3.09	4.18	37.22	
1753 ...	2.11	3.82	3.78	0.17	4.60	2.79	8.48	7.67	4.82	3.99	2.18	2.97	43.39	
1754 ...	0.86	1.83	1.23	0.44	0.00	2.84	8.87	8.67	3.76	3.39	0.62	1.13	31.69	
1755 ...	1.28	1.41	1.41	4.31	2.29	7.15	6.48	9.75	0.21	1.12	3.74	0.62	44.44	
1756 ...	2.73	1.10	3.52	4.31	1.19	5.33	1.69	5.51	3.72	0.46	0.84	1.04	30.62	
1757 ...	4.80	2.90	3.41	2.16	2.66	4.78	10.87	3.20	7.72	5.01	5.35	1.83	1.94	36.37
1758 ...	0.53	0.53	1.76	0.19	1.91	4.71	4.49	1.72	4.56	3.01	3.79	2.63	1.10	53.94
1759 ...	1.86	2.10	1.89	2.50	3.10	1.89	3.15	5.55	6.81	3.75	2.73	1.12	1.99	42.09
1841 ...	4.49	3.00	7.25	2.36	0.72	4.32	5.31	16.90	3.75	2.73	1.12	1.99	53.94	
1842 ...	0.54	2.79	0.05	1.56	4.69	4.39	9.17	6.48	3.12	3.54	2.35	3.41	52.79	
1843 ...	1.52	1.28	12.14	0.65	3.22	3.59	8.96	9.68	8.11	2.60	0.77	2.20	44.69	
1844 ...	2.21	2.33	4.20	1.50	2.24	1.80	0.45	7.38	4.95	1.53	5.40	2.50	30.39	
1845 ...	3.65	1.20	2.72	0.10	7.62	1.69	8.02	9.42	2.27	5.51	0.62	3.62	46.44	
1846 ...	4.46	3.79	5.72	2.43	2.53	5.24	4.32	8.24	3.03	2.44	0.56	1.58	44.34	
1847 ...	1.65	2.80	6.54	0.77	6.91	3.00	9.26	9.21	4.28	0.72	0.72	1.97	47.83	
1848 ...	0.73	2.73	0.17	0.27	4.62	3.40	4.73	4.59	4.62	9.05	1.67	4.12	43.40	
1849 ...	0.23	1.36	0.80	0.22	3.53	1.64	6.35	5.16	6.27	3.91	0.23	0.99	30.69	
1850 ...	2.16	1.94	5.17	2.10	2.64	0.44	1.06	4.56	1.17	0.58	0.63	1.94	23.69	
1851 ...	3.08	0.85	0.97	1.19	0.58	9.76	6.32	5.44	0.46	0.86	2.50	1.13	33.14	
1852 ...	0.62	0.81	3.57	4.50	4.22	5.18	16.93	4.21	12.27	1.16	1.93	4.32	49.72	
1853 ...	1.07	2.00	2.77	0.11	1.61	3.83	10.06	3.58	10.62	2.87	3.12	1.84	43.48	
1854 ...	2.87	2.99	0.87	1.04	5.29	4.18	6.62	1.56	8.73	1.33	1.09	1.05	37.62	
1855 ...	0.75	0.81	4.41	0.88	5.39	3.69	4.42	2.69	3.28	0.86	0.97	6.70	34.85	
1856 ...	7.02	2.01	6.41	1.00	7.87	5.04	3.49	7.25	1.95	2.25	2.54	2.29	49.12	
1857 ...	1.61	1.35	2.50	3.95	2.26	2.87	9.57	2.25	1.21	2.33	2.87	5.30	38.13	
1858 ...	2.85	5.06	1.80	1.14	4.13	2.05	7.89	6.79	8.28	0.93	4.09	2.51	48.12	
1859 ...	4.21	3.85	5.31	2.05	0.45	7.27	4.17	15.15	1.85	0.60	[2.44]	2.85	[50.19]	
1861 ...	5.37	2.83	2.38	3.58	4.19	1.92	0.86	7.89	[5.49]	4.37	[2.44]	[3.16]	[44.40]	
1871 ...	1.27	4.66	4.72	5.60	7.87	2.33	2.91	14.97	6.52	4.76	4.09	3.67	63.37	
1872 ...	3.78	5.13	9.78	2.46	6.30	1.87	2.30	7.81	7.88	3.89	3.40	4.46	57.06	
1873 ...	4.13	2.27	3.05	1.33	6.30	6.29	6.97	12.94	8.18	2.07	5.08	4.94	62.15	
1874 ...	3.51	10.45	3.45	2.95	5.50	2.29	13.74	7.06	6.66	1.85	2.11	2.94	62.51	
1875 ...	7.77	4.27	6.37	4.56	8.51	3.15	1.05	1.91	4.18	3.90	3.38	1.92	50.97	
1876 ...	0.63	2.43	2.54	4.93	3.77	14.98	11.26	5.10	11.26	14.32	1.35	5.85	78.42	
1877 ...	4.44	2.96	7.86	15.00	2.71	10.31	10.21	2.21	6.30	4.87	7.02	4.22	78.11	
1878 ...	7.83	3.15	1.94	0.68	6.32	5.47	12.10	10.73	8.28	3.98	3.18	5.38	77.44	
1879 ...	1.74	4.56	1.44	4.29	3.36	3.29	7.77	4.50	5.90	6.74	3.70	1.00	50.29	
1880 ...	2.15	3.97	2.01	3.65	0.90	2.18	5.77	3.07	4.89	9.19	5.50	3.41	46.69	
1881 ...	5.08	1.56	4.11	3.31	0.48	1.47	4.99	7.25	5.49	1.59	2.15	4.76	43.20	
1882 ...	1.09	1.09	5.06	2.72	1.82	9.12	5.35	9.32	5.85	6.56	3.54	3.99	57.01	
1883 ...	4.66	0.92	4.84	3.47	8.62	2.88	8.93	10.05	2.36	1.33	1.08	2.81	51.35	
1884 ...	5.89	4.29	4.39	3.45	2.18	8.25	9.52	6.12	11.03	0.35	1.49	3.26	60.22	
1885 ...	0.88	3.64	1.75	1.17	2.20	5.90	7.49	19.18	3.32	8.09	1.94	3.60	67.93	
1886 ...	5.64	2.13	2.60	1.19	1.00	10.78	7.16	3.28	3.03	0.01	0.33	1.79	35.94	
1887 ...	4.30	2.29	0.50	3.53	4.26	4.54	7.74	4.12	1.31	3.55	0.64	7.91	44.69	
1888 ...	1.95	3.64	3.64	1.38	5.82	3.14	6.06	4.01	5.33	4.83	7.54	2.12	49.46	
1889 ...	6.46	4.54	7.49	2.41	0.98	5.90	6.74	7.36	2.17	0.73	7.28	0.03	52.15	
1890 ...	1.28	2.28	1.72	2.58	3.67	1.32	12.87	5.16	11.89	4.64	0.42	1.01	47.84	
Mean...	2.93	2.91	3.52	2.50	3.70	4.59	6.44	7.13	5.49	3.32	2.44	3.16	48.13	

Table of miscellaneous meteorological data for November, 1890—Signal Service observations.

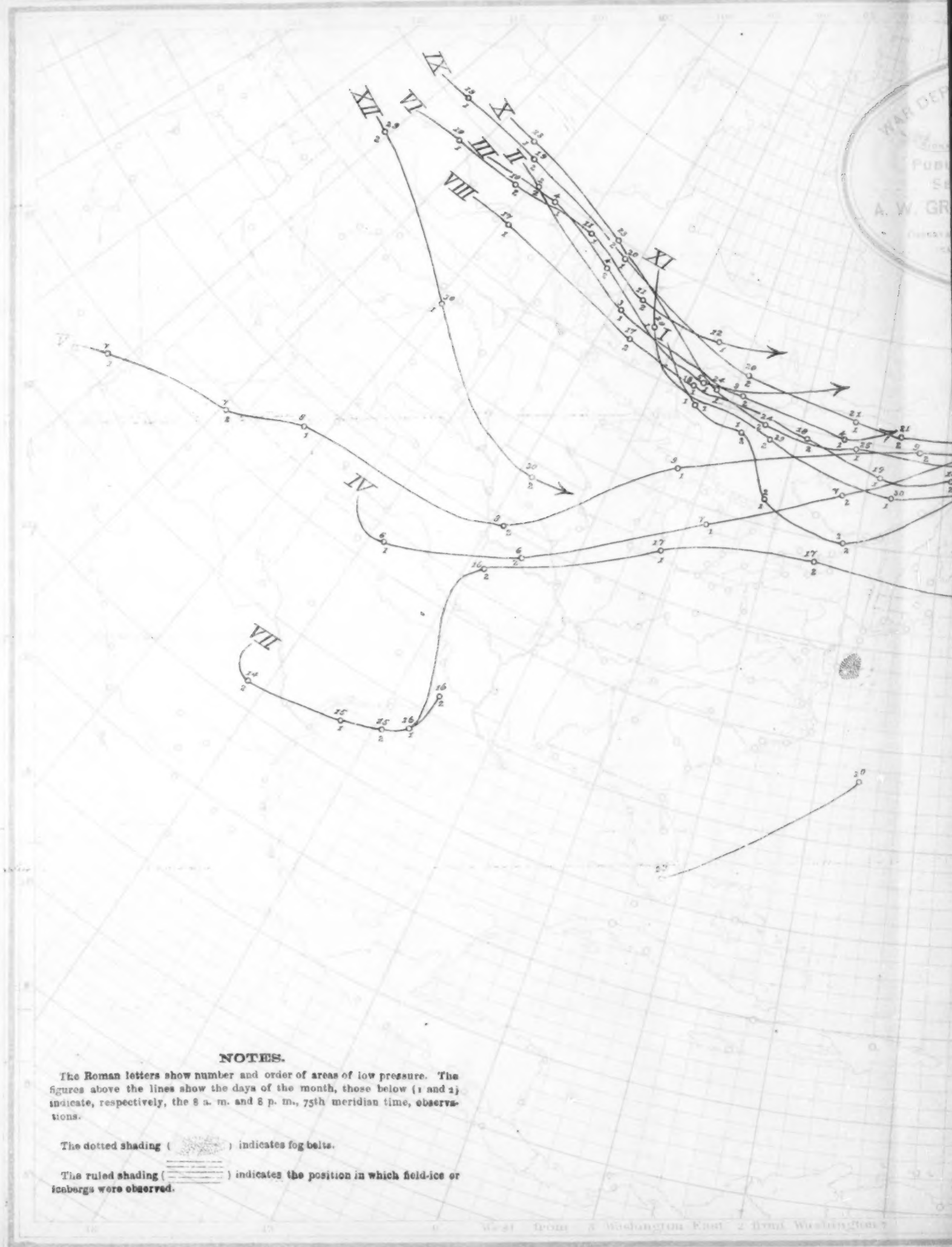
Stations and districts.	Elevation above sea-level, feet.	Pressure, in inches.		Temperature of air, in degrees Fahrenheit.								Wind.				Precipitation data since opening of station.																	
		Mean actual.	Mean reduced.	Monthly range.	Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal precipitation.	Total movement, miles.		Prevailing direction.	Maximum velocity.		Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	Average cloudiness, tenths.		Length of record, years.	Greatest for month.		Year.	Least for month.	Year.
																	Miles per hour.	Direction.		Miles per hour.	Direction.					8 a. m.	8 p. m.		Year.	Year.			
New England.																																	
Eastport	53	29.88	29.94	1.11	40.9	-0.6	55	41.6	16	30.7	25	3	28.4	74.2	1.35	-3.02	7,455	sw.	38	se.	7	4	10	16	14	5.6	5.6	17	8.20	1877	1.47	1882	
Portland	99	29.87	29.98	1.00	36.2	-0.8	55	43.7	13	30.1	25	3	28.2	75.2	2.31	-1.76	5,868	nw.	26	nw.	23	11	7	12	10	5.9	4.4	20	7.95	1889	0.93	1882	
Manchester	247	29.74	30.01	0.91	36.6	-0.9	63	45.0	11	28.3	31	4	26.3	70.4	1.35	-3.93	3,936	nw.	26	nw.	23	13	7	10	9	5.9	4.4	20	5.01	1889	1.35	1880	
Northfield	872	29.04	30.01	0.76	31.6	-0.9	63	39.8	9	23.5	28	3	25.2	79.4	2.28	-3.10	7,109	w.	41	w.	23	4	11	9	16	17	1.5	8	4	3.82	1876	2.28	1890
Boston f.	125	29.88	30.02	0.95	41.8	-0.2	64	49.1	15	34.5	25	5	33.6	77.0	1.37	-3.23	8,285	sw.	36	se.	18	12	11	9	10	5.9	4.2	21	11.03	1876	0.89	1880	
Nantucket	14	30.02	30.03	0.94	44.0	-0.2	60	49.3	25	36.8	18	3	39.6	81.9	0.89	-3.34	7,764	sw.	36	se.	18	12	11	7	10	5.1	4.0	5	7.80	1889	0.89	1880	
Wood's Holl	22	30.02	30.03	0.94	43.1	-0.2	62	49.6	18	36.6	22	3	39.6	81.9	0.89	-3.34	7,764	sw.	36	se.	18	12	11	7	10	5.1	4.0	5	7.80	1889	0.89	1880	
Vineyard Haven.	22	30.02	30.03	0.94	43.1	-0.2	62	49.6	18	36.6	22	3	39.6	81.9	0.89	-3.34	7,764	sw.	36	se.	18	12	11	7	10	5.1	4.0	5	7.80	1889	0.89	1880	
Block Island	27	30.02	30.05	0.87	44.0	-1.0	60	49.2	19	38.7	17	5	37.3	76.8	0.66	-3.52	11,737	nw.	42	nw.	18	18	8	4	6	4.1	3.3	11	6.47	1889	0.66	1890	
Narragansett Pier	22	30.02	30.05	0.87	44.0	-1.0	60	49.2	19	38.7	17	5	37.3	76.8	0.66	-3.52	11,737	nw.	42	nw.	18	18	8	4	6	4.1	3.3	11	6.47	1889	0.66	1890	
New Haven.	107	29.93	30.05	0.78	41.7	-0.7	69	49.3	17	36.1	24	3	33.0	76.0	0.67	-3.26	5,190	nw.	44	sw.	18	9	13	8	7	5.9	3.5	18	7.78	1889	0.67	1890	
New London	47	29.98	30.03	0.82	43.2	-0.2	65	49.6	18	36.8	21	3	33.0	76.0	0.86	-3.24	5,354	nw.	40	nw.	18	11	13	6	9	4.8	3.3	20	6.19	1889	0.67	1890	
Mid. Atlantic States.																																	
Albany	85	29.96	30.05	0.86	38.4	-1.2	59	45.4	14	31.4	25	5	31.2	79.3	1.18	-1.92	5,369	nw.	34	w.	18	5	14	11	11	5.7	5.4	17	5.40	1886	0.97	1882	
New York City	185	29.87	30.07	0.76	45.9	-0.9	71	52.8	18	39.0	22	5	35.6	75.8	0.82	-2.09	8,224	nw.	42	nw.	22	8	17	5	10	5.9	3.9	21	9.82	1889	0.82	1890	
Harrisburg	377	29.69	30.11	0.78	43.4	-0.4	64	50.5	22	36.3	26	7	33.8	72.2	1.12	-2.09	4,883	w.	36	w.	22	11	9	10	8.6	3.4	3	6.89	1886	1.12	1890		
Philadelphia	117	29.98	30.10	0.75	40.4	-0.4	70	54.0	23	38.9	27	7	34.4	70.2	0.80	-2.38	7,310	nw.	36	nw.	20	10	13	7	7	6.1	3.9	17	7.31	1876	0.80	1890	
Atlantic City	53	30.05	30.10	0.75	46.0	-1.0	70	51.8	18	40.2	24	4	38.9	79.2	0.38	-3.18	7,034	nw.	36	nw.	22	17	7	6	6	4.7	1.9	17	6.84	1885	0.85	1890	
New Brunswick	76	30.01	30.10	0.68	42.2	-2.2	69	51.2	17	33.3	29	6	34.8	66.1	0.71	-2.36	3,342	nw.	24	nw.	22	15	9	6	9	4.4	3.0	20	6.85	1877	0.65	1882	
Baltimore	112	30.00	30.12	0.72	48.0	-3.0	75	57.1	24	38.8	36	4	35.6	71.4	0.79	-2.06	4,596	nw.	40	nw.	18	13	4	13	6	5.7	3.8	21	7.18	1877	0.79	1890	
Washington City	112	30.00	30.12	0.72	48.0	-3.0	75	57.1	24	38.8	36	4	35.6	71.4	0.79	-2.06	4,596	nw.	40	nw.	18	13	4	13	6	5.7	3.8	21	7.18	1877	0.79	1890	
Cape Henry	685	29.38	30.14	0.60	51.4	-4.4	81	61.7	26	41.2	39	4	36.7	67.6	0.23	-3.19	2,884	nw.	24	nw.	19	13	7	10	3	5.1	4.3	20	6.05	1877	0.23	1890	
Lynchburg	43	30.09	30.13	0.65	52.8	-0.8	79	60.8	30	44.7	27	3	33.2	77.7	0.03	-3.06	5,131	nw.	30	w.	19	16	9	7	10	3	5.4	3.3	20	6.04	1881	0.03	1890
S. Atlantic States.																																	
Charlotte	808	29.30	30.15	0.51	55.4	-5.4	78	65.6	29	45.1	31	6	42.0	70.8	0.23	-3.19	2,891	se.	24	w.	19	19	4	7	4	3.1	1.9	13	5.96	1880	0.23	1890	
Hatteras	11	30.14	30.16	0.62	55.8	-0.8	72	61.3	38	52.2	15	3	49.3	79.0	0.07	-5.51	8,126	ne.	40	nw.	20	18	9	3	2	9.2	2.7	17	9.32	1884	0.7	1890	
Kitty Hawk	388	29.73	30.16	0.56	53.8	-2.6	73	63.9	33	43.9	23	4	43.4	75.6	0.03	-3.10	4,732	sw.	23	nw.	19	15	7	8	4	2.7	3.1	4	3.07	1889	0.06	1890	
Southport	78	30.08	30.17	0.57	57.4	-2.4	80	66.9	32	48.0	34	5	47.8	79.9	0.36	-2.30	4,029	ne.	24	sw.	18	17	8	5	2	2.1	2.6	20	5.50	1888	0.19	1886	
Wilmington	52	30.11	30.16	0.50	57.8	-2.4	81	68.8	38	54.6	25	7	53.8	82.0	0.42	-2.78	4,161	nw.	22	sw.	18	17	8	5	2	4.2	3.3	20	7.54	1888	0.33	1886	
Charleston	52	30.11	30.16	0.50	57.8	-2.4	81	68.8	38	54.6	25	7	53.8	82.0	0.42	-2.78	4,161	nw.	22	sw.	18	17	8	5	2	4.2	3.3	20	7.54	1888	0.33	1886	
Columbia	183	29.99	30.19	0.48	58.8	-4.8	80	70.9	32	46.7	33	6	47.8	82.0	0.47	-3.05	1,364	sw.	13	w.	30	19	6	5	5	3.1	3.6	20	7.76	1871	0.47	1890	
Augusta	87	30.08	30.18	0.46	61.5	-3.5	79	70.6	36	52.4	29	5	51.6	80.4	0.51	-1.75	3,487	se.	21	nw.	30	15	11	4	6	3.1	1.8	20	5.74	1873	0.29	1887	
Savannah	43	30.10	30.15	0.40	65.6	-3.6	84	75.1	39	56.2	27	10	56.0	82.1	2.26	-0.49	3,565	sw.	24	w.	30	16	11	3	6	1.6	3.3	20	6.09	1886	0.09	1883	
Florida Peninsula.																																	
Jupiter	28	30.05	30.06	0.46	73.7	-0.2	83	78.6	53	68.8	21	5	65.8	76.2	4.95	-0.23	8,079	se.	36	nw.	29	2	15	13	8	6.4	5.0	3	4.95	1890	2.47	1889	
Key West	22	30.04	30.06	0.36	74.8	-0.2	83	78.3	65	71.2	13	3	68.8	82.2	4.07	-2.34	9,966	se.	52	nw.	29	10	7	13	11	5.6	4.2	21	6.03	1884	0.13	1886	
Mico	68.6	30.09	30.13	0.38	69.2	-0.8	86	78.6	43	59.8	32	5	59.8	81.0	3.31	-3.62	3,629	ne.	24	ne.	29	9	14	7	6	3.8	2.9	4	5.70	1890	0.35	1889	
Tampa	36	30.09	30.13	0.38	69.2	-0.8	86	78.6	43	59.8	32	5	59.8	81.0	3.31	-3.62	3,629	ne.	24	ne.	29	9	14	7	6	3.8	2.9	4	5.70	1890	0.35	1889	
Titusville	44	30.08	30.12	0.41	69.0	-0.8	83	75.8	49	62.3	23	6	62.5	85.4	3.26	-0.49	7,816	ne.	52	ne.	29	14	11	5	12	3.4	2.2	4	8.68	1888	0.88	1887	
Eastern Gulf States.																																	
Atlanta	1,139	28.97	30.17	0.46	61.0	-4.3	82	68.2	30	47.1	31	7	42.2	65.8	0.18	-4.09	4,666	nw.	32	nw.	3	23	5	2	4	1.5	1.2	13	8.21	1880	0.18	1890	
Pensacola	56	30.09	30.15	0.34	62.8	-3.8	80	71.1	35	54.4	25	4	53.6	80.0	0.60	-3.93	6,021	nw.	25	ne.	20	18	5	2	7	3.8	3.1	12	11.07	1885	0.65	1887	
Auburn	35	30.12	30.16	0.34	61.1	-3.1	81	71.2	36																								

Table of miscellaneous meteorological data for November, 1890—Signal Service observations—Continued.

Stations and districts.	Elevation above level, feet.	Pressure, in inches.			Temperature of air, in degrees Fahrenheit.								Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal precipitation.	Wind.			Total movement, miles.	Prevailing direction.	Miles per hour.	Direction.	Date.	Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	8 a. m. Average cloudiness, tenths.	Length of record, years.	Precipitation data since opening of station.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		Mean actual.	Mean reduced.	Monthly range.	Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.					Maximum velocity.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

Chart I. Tracks of Areas

NOV 1881



NOTES.

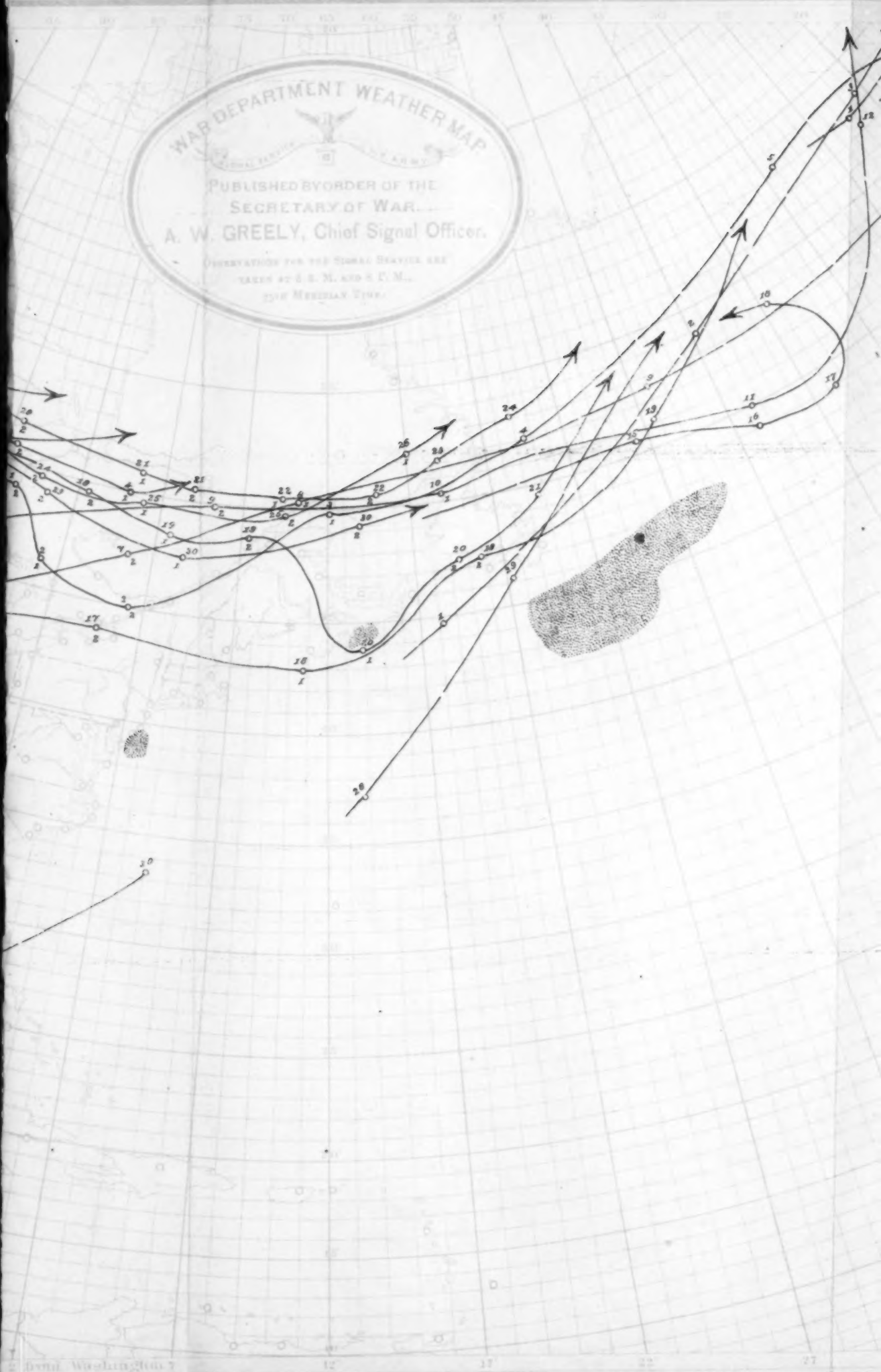
The Roman letters show number and order of areas of low pressure. The figures above the lines show the days of the month, those below (1 and 2) indicate, respectively, the 8 a. m. and 8 p. m., 75th meridian time, observations.

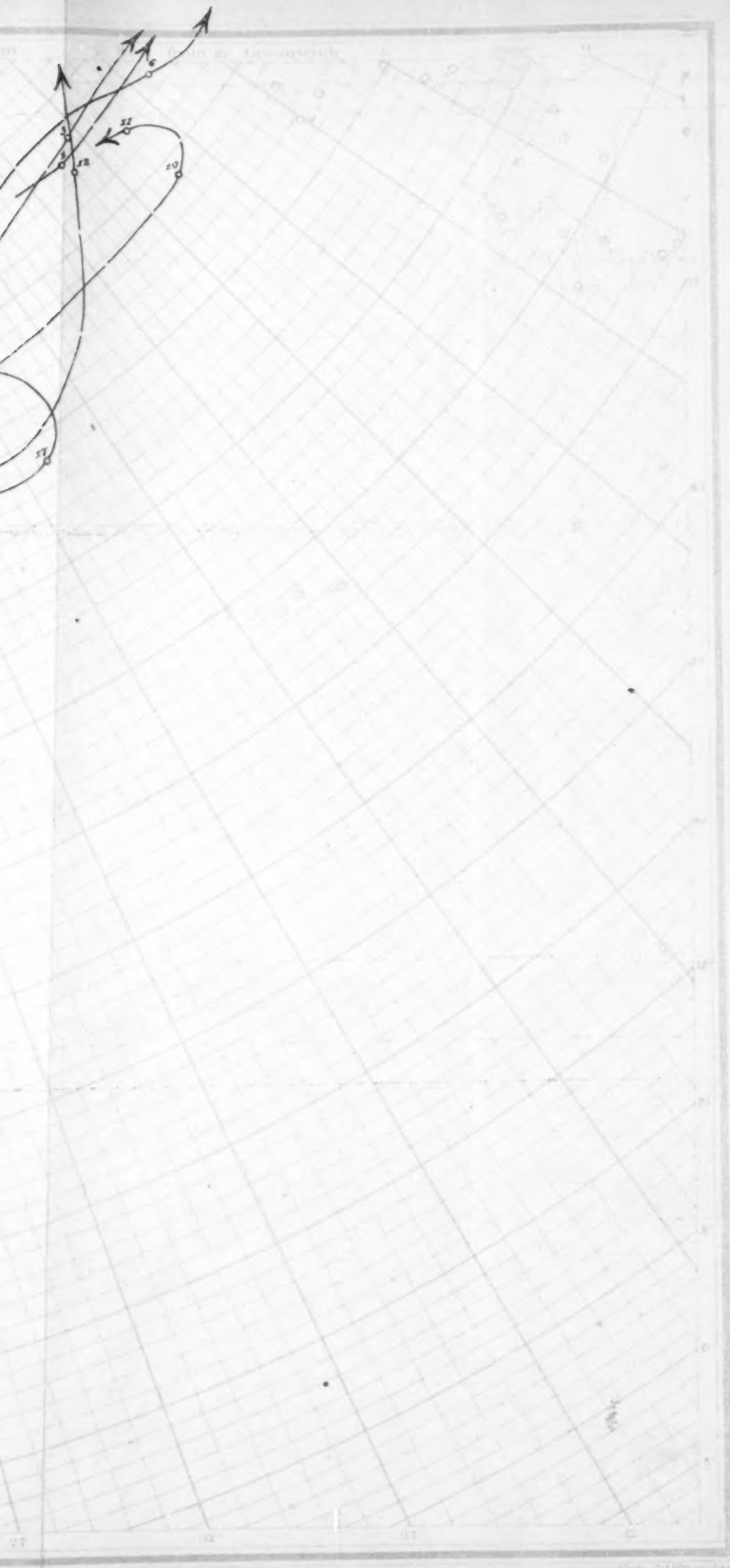
The dotted shading () indicates fog belts.

The ruled shading () indicates the position in which field-ice or icebergs were observed.

West from 3 Washington East 2 from Washington

Part I. Tracks of Areas of Low Pressure. November, 1890.





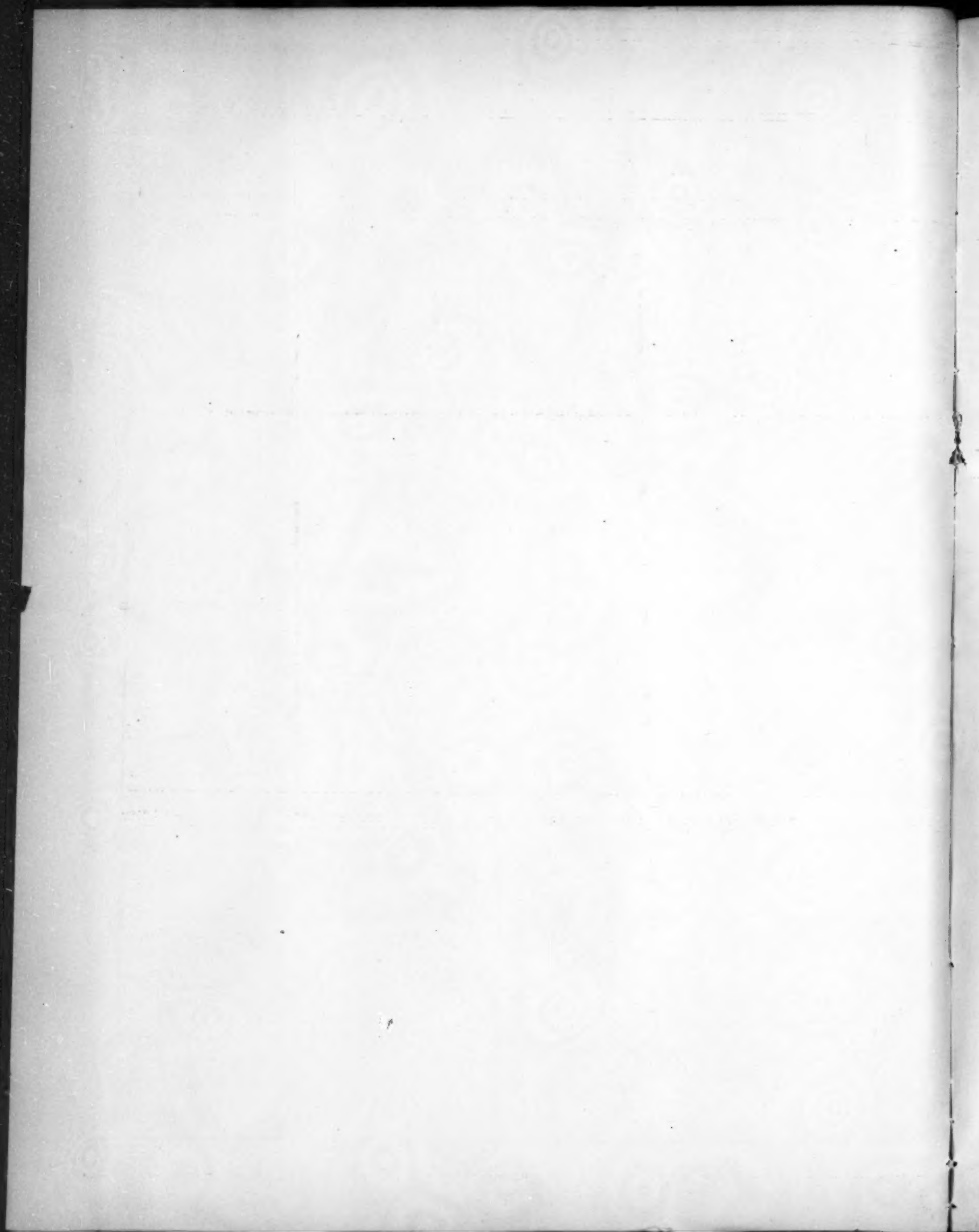


Chart III. Precipitation, November 1890.

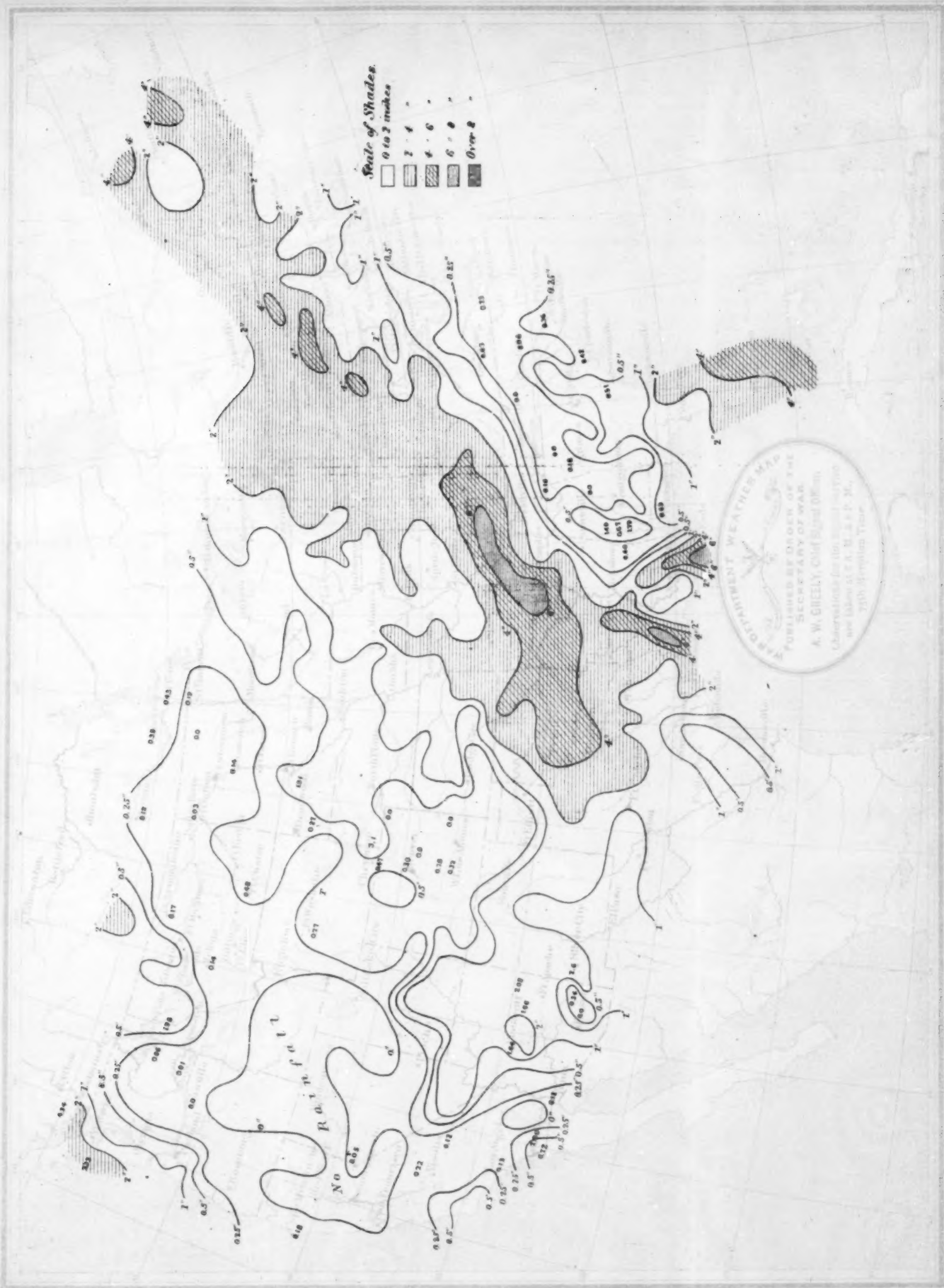


Chart IV. Depth of Snow (inches) reported on ground November 30, 1890, and Limits of Freezing Weather.

